

# DOMESTIC CHALLENGES AND GLOBAL COMPETITION IN AVIATION MANUFACTURING

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## HEARING

BEFORE THE

SUBCOMMITTEE ON AVIATION OPERATIONS,  
SAFETY, AND SECURITY

OF THE

COMMITTEE ON COMMERCE,  
SCIENCE, AND TRANSPORTATION  
UNITED STATES SENATE

ONE HUNDRED THIRTEENTH CONGRESS

SECOND SESSION

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JULY 31, 2014

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## **DOMESTIC CHALLENGES AND GLOBAL COMPETITION IN AVIATION MANUFACTURING**

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**THURSDAY, JULY 31, 2014**

U.S. SENATE,  
SUBCOMMITTEE ON AVIATION OPERATIONS, SAFETY, AND  
SECURITY,  
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,  
*Washington, DC.*

The Subcommittee met, pursuant to notice, at 10:33 a.m. in room SR-253, Russell Senate Office Building, Hon. Maria Cantwell, Chairman of the Subcommittee, presiding.

### **OPENING STATEMENT OF HON. MARIA CANTWELL, U.S. SENATOR FROM WASHINGTON**

Senator CANTWELL. The U.S. Senate Committee on Commerce, Science, and Transportation Subcommittee on Aviation Operations and Safety will come to order.

I want to thank my colleague Senator Ayotte for helping us get this morning's hearing underway, and my colleagues who are here, Senator Wicker and especially Senator Kirk from Illinois, who is going to be our first witness presenting today.

I am also pleased that we are going to be hearing from a distinguished panel.

Today's hearing is entitled "Domestic Challenges and Global Competition in Aviation Manufacturing." Aviation manufacturing is one of America's largest employers, and commercial and general aviation industries support over 1.2 million jobs.

But these jobs are threatened, if we fail to remain competitive. American companies like Boeing and Gulfstream are leaders in their respective markets, and they work hard to continue to innovate.

Don't get me wrong, I am all for competition. It drives innovation. It creates new models of efficiency. It drives down costs to consumers.

But what we are going to hear about at this hearing today are some of the unique challenges American manufacturers face as they compete on an international basis, sometimes against foreign competitors who are either state-owned or state-subsidized. And according to one U.S. manufacturer, some of these competitions can be as much as up to a 55 percent discount on airplanes.

So while U.S. manufacturers struggle to continue to be innovative, they also have to face the fact that sometimes these unfair competition issues drag on forever and ever.

The WTO case against E.U. subsidies of Airbus has dragged on now for more than 12 years, and while that time has happened, they often face a loss in competitive advantage in dealing with various issues.

According to Ron Kirk, who was the U.S. Trade Representative at the time of the WTO ruling on this most recent case between Boeing and Airbus, it cost Boeing's market share and lost sales of over 342 aircraft.

So the WTO is unlikely to solve the problem before competitors eat into market share or job loss.

In a recent Finance hearing, Stephen Ezell of the Information and Technology and Information Foundation said, "When you consider we have lost one-third of manufacturing jobs in the prior decade," meaning our challenges with the downturn of the economy, he said, "if we don't get our act right, we could lose 20 percent to 30 percent more in the coming decades. It is not inevitable. It shouldn't happen. It doesn't have to happen."

That is why we are here today, to talk about everything we can do in aviation manufacturing to stay competitive. Because of the massive resources required to develop, produce, and market commercial airplanes, when we talk about aviation, we are often not talking about companies, as far as competition, but sometimes talking about actual countries.

China, as Dr. Crane will tell us in his report, has made the creation of national aviation manufacturing a priority and has spent billions of dollars to reach that goal.

Russia is currently selling its own passenger aircraft and has signed an agreement with China to develop a wide-body plane intended to compete on a global scale.

Countries like France, Britain, Germany, and Spain, despite a WTO ruling in 2012 against the E.U. for giving \$18 billion in illegal aid, recently continued to support the new Airbus 350 to the tune of almost \$3 billion in launch aid.

So at a time when everybody is looking at how to compete in the marketplace, we have to realize that this marketplace also brings a lot of competition that is supported by these individual governments.

The state-owned commercial aircraft corporation of China, Comac, enjoys the full support of Chinese government and industrial leaders. And next year, Comac's C919, a jet designed to compete with the 737, will fly for the first time, with delivery starting in 2018.

While many experts expect the C919 will be behind the technology of other products in its class, we know that they are going to continue to work on closing the technology gap.

That is why we need to do everything we can to make sure that American aerospace stays competitive. I believe in American innovation, but we also need a level playing field.

We also face our own domestic challenges. We need to continue to develop a skilled workforce that manufacturers can depend on. We need to make our certification process more efficient to allow innovation. We are going to hear from Mr. Dillingham about that today. And we also have to make sure that while we are improving

that certification process, we continue our most important mission and focus on safety.

We also need to continue to make innovation improvements, like greener skies and jet fuel issues.

Finally, we need to reauthorize the Export-Import Bank. There are 60 countries across the globe that have credit agencies similar to the Export-Import Bank, and many of them are more aggressive in the ways that they provide assistance.

According to a study released this week by the National Association of Manufacturers, Japan's credit export agency is nearly four times the size of the Ex-Im Bank, while Japan's economy is less than half of our size. And over the last 8 years, China has expanded its export credit authorization by 867 percent. In 2013, the value of China's export credit authorization was five times that of the Ex-Im Bank.

Now, I want to point out that the United States, because of the Export-Import Bank, is part of the Aircraft Sector Understanding, an official organization that we will hear more about today that really focuses on making sure there is a fair focus on cost and expenses, and that they are no more expensive than traditional financing. If somehow we got rid of the Export-Import Bank, the United States would no longer be a participant in the very discussions that some of the critics of the Export-Import Bank say that they want to be able on a global basis to make sure that there are fair rates competitive with the financial ones involved in the financial sector overall.

So I hope that we can address these issues in this hearing today.

I recently visited Gulfstream Manufacturing, and I continue to focus on visiting various aerospace manufacturing across the United States. This is a very important sector that employs many Americans, and we want to keep very competitive in this area.

Now I will turn to my colleague, Senator Ayotte.

**STATEMENT OF HON. KELLY AYOTTE,  
U.S. SENATOR FROM NEW HAMPSHIRE**

Senator AYOTTE. I want to thank Chairwoman Cantwell for holding this hearing to discuss the challenges facing domestic and global competition in aviation manufacturing.

It is certainly wonderful to see our colleague Senator Kirk here today. I look forward to hearing from him, as well as to have Senator Wicker here at this hearing.

According to the Federal Aviation Administration, in 2013, the aviation industry supported over 10 million jobs, contributed \$1.3 trillion to total economic activity, and accounted for 5.2 percent of our U.S. GDP.

Furthermore, air carriers operating in the U.S. airspace transported more than 837 million passengers and moved \$61.2 billion revenue ton-miles of freight.

The FAA released a report earlier this summer stating that civil aircraft manufacturing continues to be the top net exporter in the United States with a \$54.3 billion positive impact on our trade balance.

As someone who strongly supports free trade, I find this to be very encouraging for the industry. But we all know that we need

to continue to be vigilant to ensure that this industry, which is so important to our economy, is more competitive in this global marketplace with the challenges that we face from competitors around the world.

Clearly, this is an industry that is an important driver of our economy in terms of not only the growth of the economy but also the creation of jobs.

In my home state, New Hampshire, we have a very strong aviation manufacturing presence. Not only do we have Boeing suppliers that create very important jobs for my constituents, but we also have four prominent businesses in New Hampshire that provide key parts to major aviation companies. I would like to highlight them briefly: Cobham Antenna Systems in Exeter, New Hampshire; Astronics Corporation in Lebanon; Safran Aerospace that has recently opened a plant in Rochester, New Hampshire; and GE in Hooksett.

Each of these companies I have had the pleasure of visiting, almost all of them, and they play a very important role in terms of what we are seeing. But they have also expressed to me, each of them, the challenges they face in terms of competition in this country.

Cobham specializes in air-to-air refueling; audio, video, and data communications; defense electronics; and life-support and mission equipment. It is a major supplier for the Joint Strike Fighter, Boeing 787, and Global Hawk UAV.

Astronics is a leader in advanced high-performance lighting, electronic power, avionics data products, and automatic test systems for the global aerospace and defense industries.

Safran is actually a multinational company, and we are pleased that they just opened a plant in Rochester, New Hampshire, that will really be supporting the aviation industry. Safran is going to create 400 new jobs in New Hampshire. One of the challenges that Safran has faced that it has met in an innovative way is it has partnered with our local community college, in terms of getting the trained workforce it will need to have these 400 new manufacturing jobs in New Hampshire.

So I think that is a model that we need to look at, too, partnering with local colleges to ensure that our workers have the training that they need to meet these advanced manufacturing jobs that are needed in aviation.

And, of course, GE's aviation facility in Hooksett is very important to our state. They manufacture compressor valves, tubes, and airfoils for all GE engine programs, as well as build advanced turbo fan engines for the Super Hornet and our Growler.

I had the privilege of touring this facility recently, and I very much appreciate what they do in terms of defending our Nation.

As we hear from our panelists today, I will be particularly interested in their thoughts regarding what we can do to make this industry not only more competitive globally, as we talk about things like reauthorizing the Ex-Im Bank, but also to understand from you what we can do, thinking about our tax code, to ensure that we are more competitive as we compete with other countries around the world. The regulatory climate that this industry operates in is so important, and ultimately to our economy. How that



regulatory climate here in the United States compares to their global competitors, and how competitive that climate is or isn't for the aviation industry is so important.

Finally, I hope that the witnesses will also discuss, importantly, the reauthorization of the Export-Import Bank. I have previously supported that reauthorization. One thing I will say about this reauthorization in and of itself, if every government program would return money to reduce the deficit, then I think that we would have a lot better time here in terms of the trillions of dollars of debt that our Nation is facing.

I think it would be one thing if other countries around the world didn't have an equivalent to the Export-Import Bank, but that is not the reality that our companies are facing.

That said, what I do want to hear from our panelists about today, while I support the importance of this reauthorization, I would like to hear what types of reforms we do need to consider as we debate reauthorizing the Export-Import Bank. And one of the things we need to make sure is that our small and midsize companies have access to this capital as well to make them competitive in the global marketplace, because the reality is that many of the businesses in this country are small and midsize companies, and we hope that these small and midsize companies, if they have more access to capital, will go on to be our next generation of larger companies.

So I would like to hear about that today and what makes sense in terms of reforms that can be made to help particularly small and mid-size companies.

I want to thank all of you for being here today. I look forward to hearing from the witnesses.

And again, I want to welcome our colleague, Senator Kirk. It is great to have him here today.

Senator CANTWELL. Thank you very much, Senator Ayotte.

Senator Kirk, we do welcome you. You come from a very important aviation state. Thank you for making time this morning in your schedule to talk about how you see aviation competition.

**STATEMENT OF HON. MARK KIRK,  
U.S. SENATOR FROM ILLINOIS**

Senator KIRK. Madam Chair, could I deliver my statement standing, talking to the board?

I am surprised that the Senate knows so little about the C919. This aircraft is being developed with \$29 billion in Chinese subsidies for the R&D for the aircraft.

If you don't recognize this aircraft, it is a competitor to the 737, which as Senators, you guys probably always fly, one of the best-selling midrange U.S. airliners.

We want to make sure that just as the C919 hits the market in 2018, as we expect, we have an Export-Import Bank to finance sales of U.S. aircraft overseas. These days, when you get on an airplane for United or American, you are overwhelmingly likely to be flying in a made in the USA aircraft. We want to make sure that you are not flying China in the future days.

There are so many jobs associated with civil aviation in the United States, as the Chairwoman pointed out. This aircraft is now

coming on to compete with us. There should actually be two aircraft shown on this board. There is a Russian jet coming that is called the Superjet that will also compete in the 737 space.

I want to make sure that we have the Export-Import Bank to take on these competitors to make sure that our U.S. dominance of this field is continued.

So let's keep U.S. aviation going and make sure it is always made in the USA. That is very important for Senators who are always flying, to make sure you are always in U.S.-built and manufactured aircraft that meet U.S. standards. You want to make sure that that continues.

And that concludes my statement. So remember, you guys, the C919, it is coming to get us. And this is the time to not stop the operation of Ex-Im.

I will continue for just another moment. These aircraft generally sell for between \$50 million to \$100 million each. When we have heard about the discounts that the Chairwoman mentioned, sometimes you can get the price down to \$50 million or \$25 million, which would really wipe us out if it is priced that low.

There is a huge supply chain standing behind each one of these aircraft. Make sure this is all-American, to make sure that we keep going.

With that, let me conclude my brief on the C919. Thank you.

Senator CANTWELL. Thank you, Senator Kirk.

Could I just ask you, what do you think the impact is in the state of Illinois?

Senator KIRK. In the state of Illinois, we have about \$175 million in exports, which are funded by Ex-Im Bank, with over 100 companies.

Senator CANTWELL. Thank you.

Anybody else, questions for our colleague?

Senator KIRK. I expect to get your votes, guys.

[Laughter.]

Senator CANTWELL. As they say, a picture is worth a thousand words, so thank you very much. You have painted a very precise picture this morning.

Senator KIRK. Thank you.

Senator AYOTTE. Thank you.

Senator KIRK. Thanks, guys.

Senator CANTWELL. OK, we will now hear from our second panel. We are going to hear from Dr. Gerald Dillingham, Ph.D., Director of Civil Aviation for the U.S. Government Accountability Office; Dr. Keith Crane, Ph.D., Environmental Energy from the RAND Corporation; and Mr. Marc Allen, President, Boeing Capital Corporation.

So if all those witnesses could join us up here, we would appreciate it.

We are going to start with you, Mr. Dillingham.

**STATEMENT OF GERALD DILLINGHAM, Ph.D.,  
DIRECTOR, PHYSICAL INFRASTRUCTURE ISSUES,  
U.S. GOVERNMENT ACCOUNTABILITY OFFICE**

Dr. DILLINGHAM. Thank you, Madam Chairwoman, Ranking Member Ayotte, and members of the Subcommittee.

We have conducted several reviews examining the efficiency of FAA's aircraft certification and approval processes, and industry's concern about inconsistent regulatory interpretation.

FAA has implemented several initiatives to address these long-standing issues, but these issues persist.

Congress established requirements in Section 312 and 313 of the 2012 FAA Reauthorization Act to spur additional action on these items. In response to those requirements, FAA chartered two rule-making committees, one on the aircraft certification process and another on the consistency of regulatory interpretation.

Both committees produced a series of recommendations to assist FAA in addressing these issues. My statement today focuses on, one, FAA's progress in implementing the recommendations of the two committees; and two, the challenges that could impede the successful implementation of the recommendations and how these challenges might be addressed.

Regarding the certification process recommendations, FAA has established 14 initiatives to address these recommendations. These initiatives include developing a comprehensive roadmap of major change initiatives, improving the project sequencing process, and updating the aircraft certification regulation.

Most of these initiatives are scheduled to be completed within the next 3 years. However, FAA has established performance metrics for only five of the 14 initiatives, and has not developed metrics to measure the overall effectiveness of the collective efforts. These metrics are essential in helping FAA and the industry determine whether these initiatives are leading to improvements.

Moreover, although several initiatives are said to be on track, we are concerned that FAA expects to miss milestones for two of the most important, critical recommendations due to concerns raised by the unions representing inspectors and engineers. Missing these milestones increases the risk of delays in schedule implementation of the initiatives.

Turning to the regulatory consistency recommendations, FAA has begun implementing these recommendations. In its July 2013 report to Congress, FAA included a preliminary plan for implementing these recommendations.

FAA has also indicated that its final plan would include an implementation strategy, assign responsibilities to individuals in offices, and establish milestones and measures of effectiveness. This plan is projected to be completed next month, which is about 8 months beyond the initial target date.

Looking ahead to potential recommendation implementation challenges, FAA will likely be under increased pressure to establish more efficient processes as new aircraft material, aircraft types, and NextGen avionics are introduced into the national aerospace system.

FAA could significantly increase its chances of improving its processes and successfully adapting to the changes in the industry by working to address some key challenges. Specifically, FAA should focus on, one, identifying the necessary resources to sustain these efforts when faced with fiscal pressures; two, managing the cultural shift required to implement a risk-based approach in making certain certification and approval decisions.

This shift necessitates buy-in, support, and accountability throughout the agency, from the highest FAA management levels to the designees and safety inspectors in the field.

Additionally, FAA must ensure early and continuous involvement of industry stakeholders, and establish and use performance metrics that measure outcomes rather than outputs to help show what is actually being achieved through these initiatives, and to hold those responsible for implementation accountable for the results.

Thank you, Madam Chairwoman. That concludes my statement. [The prepared statement of Dr. Dillingham follows:]

### **Aviation Manufacturing**

#### *Status of FAA's Efforts to Improve Certification and Regulatory Consistency*

#### **Why GAO Did This Study**

Among its responsibilities for aviation safety, FAA issues certificates for new aircraft and parts, and grants approvals for changes to air operations and aircraft, based on federal aviation regulations. Various studies, GAO's prior work, and industry stakeholders have raised questions about the efficiency of FAA's certification and approval processes, as well as the consistency of its staff in interpreting aviation regulations. Over time, FAA has implemented efforts to address these issues, but they persist as FAA faces greater industry demand and its overall workload has increased. The 2012 FAA Modernization and Reform Act required FAA to work with industry to resolve these issues. In response, FAA chartered two committees—one to address certification processes and another to address regulatory consistency—which recommended improvements in 2012. In 2013, FAA published an implementation plan for addressing the certification process recommendations and promised to publish an implementation plan for addressing the regulatory consistency recommendations at a later date.

This testimony provides information on FAA's progress in implementing the (1) certification and approval process recommendations and (2) regulatory consistency recommendations. It also discusses future challenges industry stakeholders believe FAA will face in implementing these recommendations. This testimony provides the same information as GAO-14-728T, which was based on GAO products issued from 2010 to 2014, updated in July 2014 through reviews of recent FAA documents and interviews of FAA officials and industry representatives.

#### **What GAO Found**

The Federal Aviation Administration's (FAA) Aircraft Certification Service (Aircraft Certification) is responsible for addressing the certification and approval process recommendations, and has made progress. Aircraft Certification is implementing and has set milestones for completing 14 initiatives, several of which were originally begun as part of earlier certification process improvement efforts. The initiatives range from developing a comprehensive road map for major change initiatives, to improving Aircraft Certification's process for prioritizing requests for certifications and approvals (project sequencing), to reorganizing the small aircraft certification regulation. According to an update prepared by FAA in May 2014, one initiative has been completed and most are on track to be completed within 3 years. However, according to this update, two initiatives will not meet planned milestones, including the one for improving FAA's program for delegating authority to organizations to carry out some certification activities. Also, a third initiative for improving consistency of regulatory interpretation was at risk of not meeting planned milestones. Two additional initiatives, while on track for meeting planned milestones in May 2014, faced challenges because of opposition by FAA's labor unions, including one for improving Aircraft Certification's project sequencing process. GAO found in October 2013 that Aircraft Certification continued to lack performance measures for many of these initiatives, a condition that persists. In 2010, GAO had previously recommended that FAA develop a continuous evaluative process with performance goals and measures. FAA agreed but has not yet fully addressed the recommendation. Aircraft Certification officials discussed plans to develop metrics in three phases, beginning in July 2014 and in the future, for measuring (1) the progress of implementing the initiatives throughout FAA, (2) the outcomes of each initiative, and (3) the return on investment for FAA and the industry resulting from implementing the initiatives as a whole.

FAA's Flight Standards Service (Flight Standards) is responsible for addressing the regulatory consistency recommendations, and is finalizing plans to do so. FAA has not published a detailed plan with milestones and performance metrics, and officials told GAO that they intend to publish a plan by August 2014. Flight Standards officials said they were making progress in addressing the committee's top priority recommendation—mapping all FAA policy and guidance to relevant federal aviation regulations and developing an electronic system that maintains this information and that is accessible by FAA and industry users. As part of this effort, officials told GAO that Flight Standards has begun eliminating obsolete guidance and linking existing policy and guidance to the regulations.

Going forward, Aircraft Certification's and Flight Standards' efforts may face challenges that could affect successful implementation of the committees' recommendations. Many of these recommendations represent a significant shift in how FAA normally conducts business, and if the workforce is reluctant to implement such changes, FAA's planned initiatives for addressing the recommendations could be delayed. Also, the fact that FAA has not yet implemented performance measures for most of the initiatives is a concern for both GAO and the industry. As GAO concluded in October 2013, without performance measures, FAA will be unable to gather the appropriate data to evaluate the success of current and future initiatives.

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PREPARED STATEMENT OF GERALD L. DILLINGHAM, PH.D. DIRECTOR, PHYSICAL  
INFRASTRUCTURE ISSUES, U.S. GOVERNMENT ACCOUNTABILITY OFFICE

Chairwoman Cantwell, Ranking Member Ayotte, and Members of the Subcommittee:

I appreciate the opportunity to testify today on the status of the Federal Aviation Administration's (FAA) efforts to improve its certification and approval processes. As you know, FAA is responsible for aviation safety, and part of this responsibility entails issuing certificates for new aircraft and aircraft parts and equipment and granting approvals for such things as changes to air operations and aircraft, based on Federal aviation regulations. FAA's current efforts to improve these processes are aimed at: (1) improving its decision-making process for issuing certificates and approvals, (2) keeping pace with emerging technology, and (3) enabling industry growth and innovation. Studies published since 1980,<sup>1</sup> our prior work,<sup>2</sup> industry stakeholders, and experts have long raised questions about the efficiency of FAA's certification and approval processes and varying interpretations and applications of its regulations in making certification and approval decisions. More recently, several aviation industry groups have asserted that these issues persist, resulting in delays and higher costs for their members. These delays have been generally attributed to heavy staff workloads and a lack of staff resources to begin new work on certifications and approvals. With greater industry demand and the introduction of new aircraft, equipment, and technology into the national aviation system, FAA's workload has increased and is expected to grow further over the next decade. We previously concluded that it will be critical for FAA to follow through with reforms to its certification and approval processes to meet industry's future needs.<sup>3</sup>

Over time, FAA has initiated various efforts and initiatives to improve its certification and approval processes and interpret regulations more consistently, including efforts in response to findings and recommendations we made in 2010.<sup>4</sup> However, to bring further attention to these issues and spur additional action, Congress included the following requirements for FAA in the FAA Modernization and Reform

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<sup>1</sup> See National Academy of Sciences, *Improving Aircraft Safety: FAA Certification of Commercial Passenger Aircraft*, National Research Council, Committee on FAA Airworthiness Certification Procedures (Washington, D.C.: June 1980); Booz Allen & Hamilton, *Challenge 1000: Recommendations for Future Aviation Safety Regulations* (McLean, VA: Apr. 19, 1996); RTCA Task Force 4, *Final Report of the RTCA Task Force 4 "Certification"* (Washington, D.C.: Feb. 26, 1999); and Independent Review Team Appointed by Secretary of Transportation Mary E. Peters, *Managing Risks in Civil Aviation: A Review of FAA's Approach to Safety* (Washington, D.C.: Sept. 2, 2008).

<sup>2</sup> See GAO, *Aviation Safety: Certification and Approval Processes Are Generally Viewed as Working Well, but Better Evaluative Information Needed to Improve Efficiency*, GAO-11-14 (Washington, D.C.: Oct. 7, 2010) and GAO, *Aircraft Certification: New FAA Approach Needed to Meet Challenges of Advanced Technology*, GAO/RCED-93-155 (Washington, D.C.: Sept. 1993).

<sup>3</sup> GAO, *Aviation Safety: Status of Recommendations to Improve FAA's Certification and Approval Processes*, GAO-14-142T (Washington, D.C.: Oct. 30, 2013).

<sup>4</sup> GAO-11-14.

Act of 2012:<sup>5</sup> (1) work with the industry to assess and recommend improvements to the certification and approval processes (Section 312) and (2) address the findings from our 2010 report related to FAA interpreting regulations more consistently (Section 313). To meet these requirements, FAA chartered two aviation rulemaking committees in April 2012—the Aircraft Certification Process Review and Reform Aviation Rulemaking Committee (Certification Process Committee) and the Consistency of Regulatory Interpretation Aviation Rulemaking Committee (Regulatory Consistency Committee)—which made recommendations to FAA in May 2012 and November 2012, respectively. In an October 2013 statement, we made preliminary assessments of the two committees' recommendations and FAA's responses,<sup>6</sup> finding that both FAA-chartered committees took reasonable approaches in their work and made relevant, clear, and actionable recommendations to FAA. However, we also discussed challenges to making further improvements to the certification and approval processes, most notably that FAA has not developed performance metrics for measuring the outcomes of the initiatives.<sup>7</sup> In 2010, GAO made two recommendations requiring, among other things, that FAA develop a continuous evaluative process with performance goals and measures for assessing its actions to improve the efficiency of its certification and approval processes, and a method to track submission approvals.<sup>8</sup>

This testimony discusses FAA's continuing efforts related to its certification and approval processes. More specifically, it provides information on: (1) FAA's progress in implementing the Certification Process Committee recommendations, (2) its progress in implementing the Regulatory Consistency Committee recommendations, and (3) future challenges that others and we identified that FAA faces in implementing these recommendations. We provided this testimony previously, on July 23, 2014, before the Subcommittee on Aviation, Committee on Transportation and Infrastructure, House of Representatives. We were subsequently invited to provide testimony on similar issues before this subcommittee. Because the issues of concern were the same for both subcommittees, this testimony presents the same information as the July 23, 2014 testimony (GAO-14-728T). This statement is primarily drawn from several GAO products issued since 2010.<sup>9</sup> We have updated the information in July 2014 related to our previous work on the certification and approval processes through a review of more recent FAA and industry documents, including the committees' reports to FAA, FAA's reports to Congress in response to the committees' recommendations as well as additional government and industry documents and reports related to this topic. This review included the May 2012 Certification Process Committee's and the November 2012 Regulatory Consistency Committee's report to FAA; FAA's August 2012 and July 2013 reports to Congress on the results and plan for implementing recommendations made; and FAA's implementation plans to address the committees' recommendations. We also conducted interviews with FAA officials and industry stakeholders—including Boeing, the largest U.S. aircraft manufacturer—and representatives from all eight trade associations that participated in the two aviation rulemaking committees. Related GAO products are footnoted throughout the statement. The reports and testimonies cited in this statement contain detailed explanations of the methods used to conduct our prior work. We provided a draft of the new information contained in this statement to the Department of Transportation (DOT) for technical review and addressed its views in the body of our statement where appropriate.

The work upon which this testimony is based was conducted in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We

<sup>5</sup> Pub. L. No. 112-95, §§ 312 and 313, 126 Stat. 11, 66 and 67 (2012).

<sup>6</sup> GAO-14-142T.

<sup>7</sup> GAO-14-142T.

<sup>8</sup> GAO-11-14. Specifically, we recommended that FAA develop a continuous evaluative process and use it to create measurable performance goals for the actions, track performance toward those goals, and determine appropriate process changes. We also recommended that FAA develop and implement a process in Flight Standards to track how long certification and approval submissions are wait-listed, the reasons for wait-listing them, and the factors that eventually allowed initiation of the certification process. FAA partially addressed the first recommendation and fully addressed the other.

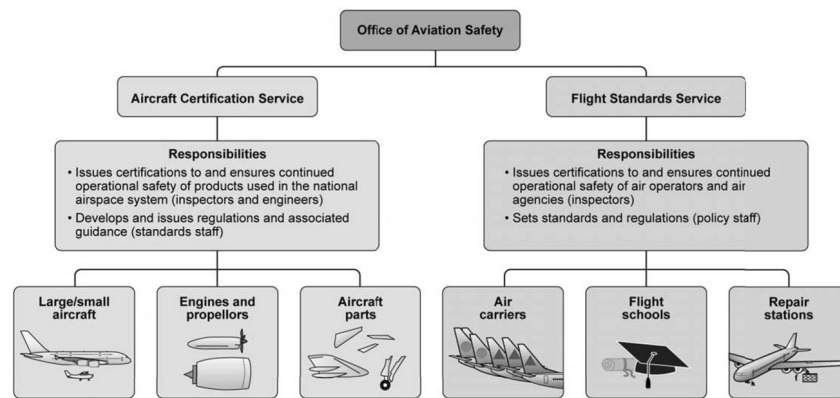
<sup>9</sup> GAO-11-14; GAO, *Aviation Safety: Additional FAA Efforts Could Enhance Safety Risk Management*, GAO-12-898 (Washington, D.C.: Sept. 12, 2012); GAO, *Aviation: Status of DOT's Actions to Address the Future of Aviation Advisory Committee's Recommendations*, GAO-13-657 (Washington, D.C.: July 25, 2013); GAO-142T; GAO, *FAA Reauthorization Act: Progress and Challenges Implementing Various Provisions of the 2012 Act*, GAO-14-285T (Washington, D.C.: Feb. 5, 2014); and GAO, *Aviation Safety: Additional Oversight Planning by FAA Could Enhance Safety Risk Management*, GAO-14-516 (Washington, D.C.: June 25, 2014).

believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

### Background

Located in FAA's Office of Aviation Safety (Aviation Safety), the Aircraft Certification Service (Aircraft Certification) and Flight Standards Service (Flight Standards) issue certificates and approvals for new aviation products to be used in the national airspace system as well as for new operators in the system, such as air carriers, based on Federal aviation regulations (see fig. 1 below). FAA inspectors and engineers interpret and implement these regulations governing certificates and approvals through FAA policies and guidance, including orders, notices, and advisory circulars. Additionally, FAA also has the authority to use private individuals and organizational entities, known as designees, to carry out many certification activities on behalf of the FAA Administrator in order to enable FAA to better concentrate its limited staff resources on safety-critical functions.<sup>10</sup>

**Figure 1: Federal Aviation Administration's Organizational Structure for Processing Certificates and Approvals**



Source: GAO presentation of FAA information. GAO-14-728T

Note: The Flight Standards Service's oversight responsibilities include air operators (*e.g.*, air carriers and air taxi services) and air agencies (*e.g.*, flight schools and repair stations).

In Aircraft Certification, approximately 880 engineers and inspectors issue certifications and approvals to the designers and manufacturers of new aircraft and aircraft engines, propellers, parts, and equipment, including the avionics and other equipment required for modernizing the air traffic control system under the Next Generation Air Transportation System (NextGen).<sup>11</sup> Since 2005, Aircraft Certification has used a project sequencing system to nationally prioritize certification submissions on the basis of available resources. In Fiscal Year 2013, Aircraft Certification issued 3,496 design approvals, 57 production approvals, and 536 airworthiness certificates.

In Flight Standards, approximately 4,000 inspectors issue certificates and approvals allowing individuals and entities to operate in the national airspace system. These include certificates to commercial air carriers, operators of smaller commercial aircraft, repair stations, and flight training schools and training centers. Flight Standards field office managers in over 100 field offices initiate certification projects within their offices on a first-come, first served basis. In Fiscal Year 2013, Flight Standards issued 259 air operator certificates and 159 air agency certificates.

When FAA receives aviation industry submissions for certificates and approvals, it must determine whether or not resources are available to begin the project. According to FAA, the agency considers its highest priority to be overseeing the contin-

<sup>10</sup> Administered under 14 C.F.R. Part 183, FAA has the authority to designate private individuals to act as representatives of the agency for examining, inspecting, and testing persons and aircraft for the purpose of issuing certificates. In 2005, FAA established the organization designation authorization program to consolidate all existing organizational delegation types into this single program. 70 Fed. Reg. 59946, Oct. 13, 2005.

<sup>11</sup> NextGen is a Federal effort to transform the U.S. national airspace system from a ground-based system of air traffic control to a satellite-based system of air traffic management.

ued operational safety of the people and products already operating within the national airspace system. The same staff that provide this oversight are also tasked with other oversight activities, such as processing new certifications and approvals that FAA considers to be lower priority. FAA wait-lists new certification and approval projects when resources are not available to begin the work. Flight Standards, in particular, has historically had difficulty keeping up with its certification workload across its regions and offices, a problem that persists.<sup>12</sup> FAA has considered ways to supplement its annual budget by expanding its sources of funding to deal with its increasing workload and staff shortages. However, FAA has limited options as it cannot levy fees on its customers for most of the services it provides to industry, including aviation product certifications and approvals.<sup>13</sup>

Attempts have been made to provide FAA with additional funding from industry stakeholders for processing certifications and approvals. In 2007, the administration submitted a reauthorization proposal to Congress that called for major changes to FAA's funding and budget structure. These changes were intended to provide a more stable, reliable basis for funding in the long term, in part by allowing FAA to impose fees on manufacturers for the various activities and costs related to aircraft certification and approval. Congress has previously authorized other agencies to charge these types of "user fees" for services rendered for processing product certification and approval. For example, the Medical Device User Fee and Modernization Act of 2002 authorized the Food and Drug Administration (FDA) to charge and retain a fee for providing services related to reviewing medical device products.<sup>14</sup> However, this broad authority has not been granted to FAA.

#### **Most FAA Initiatives to Improve Its Aircraft Certification and Approval Process Are on Track**

In May 2012, the Certification Process Committee made six recommendations to Aircraft Certification to streamline and reengineer the product certification and approval processes, improve efficiency and effectiveness within Aircraft Certification, and redirect resources for support of certification. The Certification Process Committee further recommended that FAA develop measures of effectiveness for its activities and a means of tracking its progress. In August 2012, FAA reported its plan to Congress for addressing the Certification Process Committee's recommendations, and, in July 2013, the agency issued an implementation plan with 14 initiatives. FAA updated this plan in January 2014 and plans to issue further updates on the status of the initiatives periodically.<sup>15</sup>

#### *Most Initiatives Are on Track for Meeting Planned Completion Milestones*

Since the January update, Aircraft Certification has continued its efforts to address the recommendations to improve its certification and approval processes and is implementing the 14 initiatives. These initiatives touch on various aspects of Aircraft Certification's work and, according to FAA several predate the committee's recommendations and were part of on-going continuous efforts to address long-standing certification issues and to improve the certification process. The initiatives range from developing a comprehensive road map for major change initiatives, to improving the project sequencing process, to reorganizing the small aircraft certification regulation.<sup>16</sup> Figure 2, based on an interim May 2014 update that FAA provided to us, summarizes FAA's determination of the status of the 14 initiatives.

<sup>12</sup> According to a recent DOT's Office of Inspector General (OIG) report, as of October 2013, Flight Standards faced a significant backlog of aviation certification applications, with 138 applicants wait-listed for more than 3 years. See DOT OIG, *Weak Processes Have Led to A Backlog of Flight Standards Certification Applications*, Federal Aviation Administration, Report Number AV-2014-056 (Washington, D.C.: June 12, 2014).

<sup>13</sup> Congress has historically prohibited FAA from collecting additional funding through the implementation of new aviation user fees. The latest prohibition is contained in the Consolidated Appropriations Act, 2014, Pub. L. No. 113-76, 128 Stat. 5, 578 (2014).

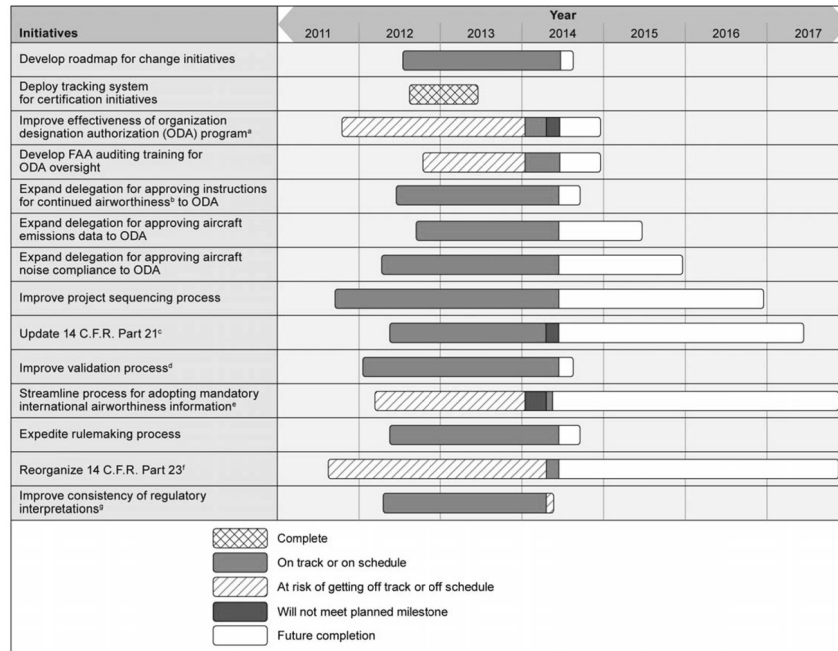
<sup>14</sup> FDA reviews applications from manufacturers that wish to market medical devices in the United States. To facilitate prompt approval of new devices and clearance of devices that are substantially equivalent to those legally on the market, Congress passed the Act to authorize FDA to collect user fees from manufacturers. In return, the Act requires FDA to meet performance goals tied to the agency's review process. Pub. L. No. 107-250, 116 Stat. 1588 (2002).

<sup>15</sup> FAA, *Detailed Implementation Plan for the Federal Aviation Administration Modernization and Reform Act of 2012*, Pub. L. No. 112-95, Section 312, Jan. 31, 2014.

<sup>16</sup> 14 C.F.R. Part 23. In June 2013, a joint FAA-industry committee recommended to FAA changes to part 23. According to FAA officials, FAA will devise a plan to implement the recommendations and initiate new rulemaking for part 23 in 2015.



**Figure 2: Status of the Federal Aviation Administration's Certification Process Initiatives (Section 312), as of May 2014**



Source: GAO presentation of FAA information./GAO-14-728T

Note: Future completion shown in the figure indicates when an initiative is planned to be completed.

<sup>a</sup>FAA delegates authority to organizations under the organization designation authorization program to carry out certain functions on behalf of the agency.

<sup>b</sup>Instructions for continued airworthiness include such things as maintenance manuals and inspection programs for maintaining operational safety of aviation products.

<sup>c</sup>14 C.F.R. Part 21 is the regulation under which aircraft products and parts are certificated.

<sup>d</sup>The validation process is a form of certification to establish compliance for airplanes designed outside their countries in order to issue a type certificate for these airplanes.

<sup>e</sup>No due date has been assigned to this initiative.

<sup>f</sup>14 C.F.R. Part 23 is the regulation under which small airplanes are certificated.

<sup>g</sup>This initiative is on hold until issuance of the implementation plan for addressing recommendations to improve regulatory consistency.

According to the May 2014 update that FAA provided to us, 1 of the 14 initiatives has been completed, and 10 initiatives are on track for completion within planned time frames. FAA deployed a tracking system to monitor the implementation of the initiatives in June 2013, but the agency indicated it is still finalizing the mechanisms for authorizing staff with the appropriate level of review and approval rights in the system. Also, ten of the initiatives were on track for meeting their planned completion milestones. For example, the initiatives to expand the authority for approving aircraft emissions data and noise compliance under the organization designation authorization (ODA) program are on track to be completed in 2015.<sup>17</sup> In addition, the initiative to expedite rulemaking by, among other things, adopting a rulemaking prioritization tool to update airworthiness standards for special conditions is scheduled to be completed in September of this year.<sup>18</sup> Further, three of the

<sup>17</sup>FAA grants ODAs for several types of certifications and approvals, including production certificates, parts manufacturer approvals, and type certificates. Some companies, such as Boeing, are granted ODA status for more than one type of certification or approval.

<sup>18</sup>FAA issues special conditions to address new and novel design features during the aircraft certification process.

initiatives were in danger of getting off track between 2011 and 2013 and are now back on schedule.

*Some Initiatives Will Not Meet or Are at Risk of Not Meeting Planned Milestones*

Although most initiatives are on track, according to FAA's May 2014 interim update, 2 of the 14 initiatives will not meet planned milestones:

- *Improve effectiveness of the ODA program:* FAA and two aviation industry groups—the Aerospace Industries Association and General Aviation Manufacturers Association<sup>19</sup>—developed a plan to improve the effectiveness of the ODA process, which is used to authorize organizations to act on behalf of FAA in conducting some safety certification work. In conjunction with the plan, FAA revised the order that outlines the new ODA procedures.<sup>20</sup> However, this initiative was purposely delayed to provide industry with additional time to adapt to the changes in the ODA procedures. Representatives of three industry associations we interviewed for this testimony supported the use and expansion of ODA by FAA. In contrast, while the Professional Aviation Safety Specialists (PASS) agrees with the concept of ODA, it has concerns related to expanding the program because representatives contend that oversight of the program requires significant FAA resources.<sup>21</sup> PASS also contends that due to current staffing shortages and increased workload, FAA does not have enough inspectors and engineers to provide the proper surveillance of the designees who would be granted this additional delegation authority. On May 14, 2014, the DOT OIG announced a review of FAA's oversight of the ODA program. The OIG plans to assess FAA's: (1) process for determining staffing levels for ODA oversight and (2) oversight of delegated organizations' program controls.
- *Update 14 C.F.R. Part 21:* FAA chartered another aviation rulemaking committee in October 2012 to evaluate improvements to the effectiveness and efficiency of certification procedures for aircraft products and parts,<sup>22</sup> along with incorporating new safety management system (SMS) concepts into the design and manufacturing environment.<sup>23</sup> The committee submitted its report to FAA in July 2014. FAA indicated that the government shutdown in October 2013 delayed some of the actions that the agency had planned to move this effort into the rulemaking process, including submission of the application for rulemaking. According to FAA, however, this delay will have no effect on completion of the final rule, which is planned for 2017.

According to FAA's May 2014 update, 1 of the 14 initiatives was at risk of not meeting planned milestones, which increases the risk that FAA will miss its established implementation time frames for the initiative for addressing its associated recommendation.

- *Improve consistency of regulatory interpretations:* The May 2014 interim update also indicated that the initiative for improving the consistency of regulatory interpretation is at risk of getting off track or off schedule. This initiative responds to the Regulatory Consistency Committee's recommendations for improving the consistency of regulatory interpretation within both Aircraft Certification and Flight Standards. However, Aircraft Certification is relying on Flight Standards to complete the implementation plan for addressing the recommendations. Therefore, Aircraft Certification has placed this initiative on hold. (The next section of this statement discusses in more detail FAA's response to the Regulatory Consistency Committee's recommendations.)

<sup>19</sup>The Aerospace Industries Association represents major U.S. aerospace and defense manufacturers and suppliers, and the General Aviation Manufacturers Association represents leading global manufacturers of general aviation airplanes and rotorcraft, engines, avionics, and components.

<sup>20</sup>FAA Order 8100.15B, change 1, *Organization Designation Authorization Procedures*, Feb. 3, 2014.

<sup>21</sup>PASS is the labor union that represents some of FAA's inspector workforce, among others.

<sup>22</sup>Title 14 of the Code of Federal Regulations Part 21, *Certification Procedures for Products and Parts*, is the basis for evaluating and certifying aircraft, engines, and propellers. The steps in the certification process include the applicant's conceptual design, the application for design approval, definition of the design standards, plans to demonstrate the design meets those standards, generation and substantiation of compliance data, determination of compliance, and issuance of the type certificate.

<sup>23</sup>SMS is a formalized process that involves collecting and analyzing data on aviation operations to identify emerging safety problems, determining risk severity, and mitigating that risk to an acceptable level. This approach to aviation safety is becoming the standard throughout global aviation industry. See GAO-14-516 and GAO-12-898.

In addition, FAA officials told us that implementation of 2 of the 14 initiatives, while shown as being on track for meeting planned milestones in the May 2014 interim update, face challenges because of opposition by FAA labor unions:

- *Improve project sequencing process:*<sup>24</sup> According to the interim May 2014 update that FAA provided to us, this initiative was listed as on track. However, FAA officials told us the status for this initiative will change to “will not meet planned milestone” in the next revision of the implementation plan expected in July 2014. They explained the change in status is a result of their not expecting to obtain concurrence from the National Air Traffic Controllers Association (NATCA), which represents Aircraft Certification’s engineers, among others, on the proposed process changes until December of this year. NATCA has expressed concerns about FAA’s plans to change the project sequencing process. The group recommended to FAA that instead of continuing with project sequencing, it should institute a system that manages projects locally on a first-come first-served basis, except for projects that fix an unsafe condition. FAA plans to implement the new process, assess its effectiveness, and modify as necessary, and issue the order for all Aircraft Certification offices’ project sequencing by December 2016.
- *Expand delegation authority for approving instructions for continued airworthiness (ICA)*<sup>25</sup> *to ODA:* Similarly, in May 2014, FAA characterized the initiative as on track for meeting the planned milestones, but FAA officials told us this initiative may face challenges as well. The Certification Process Committee noted that the volume of ICAs is rapidly increasing and that ICA delegation is underutilized, and recommended that FAA delegate some ICA review activity to improve and streamline the certification process. However, in December 2013, PASS presented a white paper to FAA that outlined its concerns and reasons it considers this to be a high-risk area that is critical to maintaining adequate safety and aircraft maintenance. PASS strongly disagreed with FAA’s plan to expand delegation of ICAs and the Certification Process Committee’s decision for making this recommendation. In response, in April 2014, FAA sent a memorandum to PASS to address the concerns and questions contained in the PASS white paper, as well as justify moving forward on the initiative. A PASS representative we interviewed for this testimony told us that PASS continues to have concerns about FAA’S expansion of the ODA program. FAA considers this issue to be resolved with PASS and has decided to go forward with the initiative.

#### *Most Certification Process Improvement Initiatives Lack Measures of Effectiveness*

As of May 2014, FAA had not developed metrics for measuring the effectiveness of 9 of the 14 initiatives it has undertaken, nor has it determined metrics to measure the effectiveness of its actions as a whole. According to FAA officials, they plan to develop these metrics in three phases. For the first phase, to be included in the July 2014 update of its implementation plan, FAA will include metrics to measure the progress of the implementation of the initiatives. For the second phase, FAA plans to subsequently develop metrics for measuring the outcomes of each initiative. For the third phase, working with the Aerospace Industries Association, FAA plans to develop metrics for measuring the global return on investment in implementing all of the initiatives, to the extent that such measurement is possible. We believe that this plan for establishing performance measures is reasonable.

#### **FAA Has Made Some Progress in Addressing Recommendations to Improve the Consistency of Its Regulatory Interpretations, but Details Are Unclear**

Unlike FAA’s efforts to improve the certification process, although FAA has made some progress towards addressing the regulatory consistency recommendations, the details remain unclear about how FAA will structure its efforts. In November 2012, the Regulatory Consistency Committee made six recommendations to Aircraft Certification and Flight Standards to improve: (1) the consistency in how regulations are applied and (2) communications between FAA and industry stakeholders. In July 2013, FAA reported to Congress on its plans for addressing the regulatory consistency recommendations, and included its preliminary plan for determining the

<sup>24</sup> As previously mentioned, Aircraft Certification instituted a sequencing program in 2005 to prioritize the processing of all new certification and approval applications based on the availability of its resources.

<sup>25</sup> ICAs include such things as maintenance manuals and inspection programs that are necessary for maintaining the continued operational safety of aviation products, such as aircraft, and aircraft parts and equipment.

feasibility of implementing these recommendations. The report also indicated that FAA would develop a detailed implementation plan that would include an implementation strategy, assign responsibilities to offices and staff, establish milestones, and measure effectiveness for tracking purposes. We found in February 2014 that FAA expected to publish such a detailed implementation plan by late June 2014, more than 6 months after its initial target date of December 2013.<sup>26</sup> In June 2014, FAA officials told us that the implementation plan was under review within FAA and estimated that the agency would issue its detailed plan in August 2014.

Until this detailed plan is released, the specific initiatives for addressing the recommendations are unknown; thus, we cannot analyze information on the status of any planned efforts similar to the information we provided above for the certification process initiatives. Further, FAA's July 2013 preliminary plan does not specify how FAA plans to measure the effectiveness of the initiatives. FAA indicated that "although there may not be any baseline for each recommendation against which to compare improvements, FAA intends to consider: (1) identifying metrics, (2) gathering and developing baseline data, and (3) periodically measuring any changes, positive or negative, in rates of completion." FAA officials provided the following information on how the agency is planning to respond to the six recommendations.

#### A Master Source Guidance System

The Regulatory Consistency Committee recommended that Aircraft Certification and Flight Standards: (1) review all guidance documents and interpretations to identify and cancel outdated material and electronically link the remaining materials to its applicable rule, and (2) to consolidate Aircraft Certification's and Flight Standards' electronic guidance libraries into a master source guidance system, organized by rule, to allow FAA and industry users access to relevant rules and all active and superseded guidance material and related documents. This recommendation for creating the master source guidance system is the top priority of the Regulatory Consistency Committee. FAA officials indicated that establishing this system will require two main components:

- As a first step, for linking (mapping) all relevant guidance materials to the regulations, FAA plans to determine which "guidance" documents exist across regional and field offices—including orders, notices, and advisory circulars—outside FAA's electronic guidance libraries, which are being used to answer questions, interpret or analyze regulations, and provide guidance on regulatory matters. In December 2013, Flight Standards sent out a memorandum requesting that staff discontinue using any guidance documents outside those found in the guidance libraries, to be effective January 15, 2014. The memorandum also asked for the staff to submit any unofficial guidance worth preserving to FAA for review. Flight Standards then conducted a review to determine which of the unofficial guidance documents submitted should be added to the guidance libraries. Several members of the Regulatory Consistency Committee responded in an e-mail to FAA to express serious concerns about this approach and stated that the committee did not envision the cancellation of any guidance before FAA developed a methodology to include or exclude such guidance. The committee members further noted that FAA's memorandum provided no method to allow existing certificate holders to retain certifications that were based on any applied guidance that had been cancelled. Further, these members requested that FAA either withdraw the memorandum or address the issues they raised and extend the date for FAA staff to comply with the memorandum. However, two other Regulatory Consistency Committee members we interviewed considered FAA's actions to get staff to discontinue the use of unofficial guidance in the field to be an appropriate first step.
- Second, FAA plans to develop a master source guidance system with the capability to consolidate information from Aircraft Certification's and Flight Standards' electronic guidance libraries as well as legal interpretations from the Office of Chief Counsel into a master guidance system to allow FAA and industry users access. Specifically, the Regulatory Consistency Committee recommended that this system be searchable so that FAA and industry users can easily access relevant rules and find the relevant guidance for the rule. FAA officials assessed the possibility of using the existing Aviation Safety Information Management System, but determined that it is not adequate because: (1) users cannot search for guidance by word and (2) it is not compatible with other FAA data systems. According to FAA officials, with about \$750,000 in approved funding

<sup>26</sup> GAO-14-285T.

for this project, FAA's information technology division is in the process of developing a dynamic regulatory system that should provide the needed capabilities. Officials indicated that when users conduct a search for a particular topic in this system, the search results should bring up multiple entries for specific guidance. Initially, Flight Standards plans to use an Excel spreadsheet for storing the guidance and then transition to the new system once it is deployed. Flight Standards hopes to test out a first version of this system within calendar year 2014. However, the officials were unsure of the total cost of developing and deploying the system.

Representatives from four of the committee stakeholders we interviewed for this testimony acknowledged that creating this system is a major effort for FAA because of the volume of FAA guidance that potentially exists across regional and field offices, some of which may not be in Aircraft Certification's and Flight Standards' electronic guidance libraries. Representatives of five industry stakeholders we interviewed provided insights on how FAA might devise a plan for creating and populating this system. Three of these noted that FAA will need to ensure that the various types of guidance—such as orders, notices, and advisory circulars—include links to the original Federal aviation regulations. One of these stakeholders recommended that FAA develop the system to allow a user looking at FAA guidance to also see all relevant background information on related decisions, and the past actions related to the guidance in question and their relation to the original regulation. Because of the large volume of FAA guidance, some stakeholders also suggested that FAA begin by first choosing a starting date for which any new rules or other new guidance it issues would include links to the relevant original regulations. However, one stakeholder we interviewed noted that FAA should consider prioritizing its effort by first mapping the guidance materials for specific key regulations and then the guidance for less significant regulations.

#### Instructional Tools for FAA Personnel for Applying Policy and Guidance

The Regulatory Consistency Committee noted multiple instances where FAA guidance appeared to have created inconsistent interpretation and application, and confusion; the Consistency Committee recommended that FAA develop a standardized decision-making methodology for the development of all policy and guidance material to ensure such documents are consistent with adopted regulations. In interviews for this testimony, FAA officials also provided some updates on how the agency will respond to the recommendation to develop instructional tools for its policy staff. FAA officials told us they had not initiated any efforts yet to address this recommendation, but would begin by focusing on developing instructions for policy staff to use for populating the master source guidance system. In August 2014, FAA plans to form an internal work group to establish a document management framework and work processes that can be used by Aircraft Certification's and Flight Standards' policy division staffs as they map existing guidance documents to applicable source regulations in the master source guidance system. The officials expected the work group would issue an internal directive for FAA personnel on work processes to be used in populating the guidance system by June of 2015.

#### FAA and Industry Training Priorities and Curriculums

The Regulatory Consistency Committee recommended that FAA, in consultation with industry stakeholders, review and revise its regulatory training for applicable agency personnel and make the curriculum available to industry. FAA officials told us that FAA has begun to develop improved training for its field staff—the third recommendation of the Regulatory Consistency Committee—so that field inspector staffs are better equipped to answer routine compliance-related questions confidently and in a consistent manner. In addition, the officials told us starting in 2015, FAA plans to conduct a gap analysis of existing training for all FAA staff who are responsible for interpreting and applying certification and approval regulations. For this analysis, FAA plans to assess whether existing training can be modified to sufficiently address any gaps. FAA also plans to coordinate with industry to share the results of this review and analysis by the end of 2015.

#### Regulatory Consistency Communications Board

The Regulatory Consistency Committee made two similar recommendations for FAA to consider: (1) establish a Regulatory Consistency Communications Board comprising various FAA representatives that would provide clarification on questions from FAA and industry stakeholders related to the application of regulations and (2) determine the feasibility of establishing a full-time Regulatory Operations

Communication Center<sup>27</sup> as a centralized support center to provide real-time guidance to FAA personnel and industry certificate/approval holders and applicants. FAA officials also discussed the agency's conceptual approach and plans for establishing a board—likely by the end of calendar year 2014—to address these two recommendations. The purpose of the board would be to provide a neutral and centralized mechanism with a standardized process for addressing and resolving regulatory compliance issues between FAA and industry. According to the committee, this board would be comprised of representatives from the relevant headquarters policy divisions in FAA to help answer complex regulatory interpretation issues that arise between FAA inspectors and engineers, and industry during the certification and approval processes. FAA officials told us the board's process, once established, would use a modified version of the agency's current Consistency and Standardization Initiative (CSI), a process established as a means for industry to appeal FAA decisions and actions.

As we found in 2010, resolution through the CSI can be a lengthy process, with the total length of the process depending on how many levels of appeal the industry stakeholder chooses.<sup>28</sup> However, as we also found, industry stakeholders have generally been reluctant to use CSI for initiating appeals and raising concerns with the local field office for fear of retribution. FAA officials told us in interviews that the modified process would help address the retribution issue, because it would rely instead on multiple sources to raise issues—not just solely on industry—and would be the final arbiter for FAA and industry in disagreements on certification and approval decisions. According to FAA officials, the board could also serve the function of the proposed operations center recommended by the committee to be a resource for assisting FAA personnel and industry stakeholders with interpretation queries and establishing consistency in regulatory application. FAA officials indicated that the agency had decided not to establish the communications center because: (1) the board could serve a similar function and (2) FAA has limited resources available to staff a communications center.

Several industry stakeholders we spoke with told us they support FAA's preliminary plans to establish the board and modify the CSI process as part of this effort. For example, several stakeholders told us that they support FAA's plans to modify the current CSI process. One of these stakeholders noted that a modified process would be more effective if it allowed for industry stakeholders to raise issues anonymously. Also, another stakeholder noted the board would not be beneficial until after FAA has established the master source guidance system because the board should be able to refer to that guidance in demonstrating how it makes decisions.

#### Clarity in Final Rules

The Regulatory Consistency Committee recommended that FAA improve the clarity of its final rules by ensuring that each final rule contains a comprehensive explanation of the rule's purpose and how it will increase safety. FAA officials told us that this recommendation has been addressed through the work of the Aviation Rulemaking Advisory Committee's Rulemaking Prioritization Working Group.<sup>29</sup> The officials told us that, as a result of this effort, all final rules, are now well-vetted across FAA. The industry representatives we interviewed had mixed opinions about whether FAA had addressed this recommendation as intended. For example, two stakeholders were in agreement with FAA that the agency had addressed it while two other stakeholders noted that FAA's new rules are still not as clear as they should be. Two stakeholders also said that it is often not the final rules but the guidance that accompanies or follows the final rules that is unclear and contributes to inconsistent interpretation and application among FAA staff.

#### Challenges that Could Affect Successful Implementation of the Committees' Recommendations

In our previous work on organizational transformations, we noted that implementing large-scale change management initiatives—like those the committees tasked FAA with—are not simple endeavors and require the concentrated efforts of

<sup>27</sup> Under this operations center concept, FAA would establish a 24-hour/7-day operations center staffed (virtually) by policy and/or legal personnel trained and experienced in the regulations, policy and guidance associated with flight operations, aircraft maintenance, aircraft certification and aircraft production.

<sup>28</sup> GAO-11-14.

<sup>29</sup> Specifically, in January 2013, FAA accepted the recommendation of the Rulemaking Prioritization Working Group that FAA should adopt a prioritization model across its lines of business for prioritizing rulemaking projects. In response, as we reported in prior work, FAA developed a tool that provides a standardized basis for evaluating and prioritizing potential rulemaking projects to be used by each line of business. See GAO-13-657.

both leadership and employees to realize intended synergies and accomplish new organizational goals.<sup>30</sup> People are at the center of any serious change management initiative because people define the organization's culture, drive its performance, and embody its knowledge base. The best approach for these types of initiatives depends upon a variety of factors specific to each context, but there has been some general agreement on a number of key practices that have consistently been found at the center of successful change management initiatives. These include, among other things, securing organizational support at all levels, developing clear principles and priorities to help change the culture, communicating frequently with partners, and setting performance measures to evaluate progress.<sup>31</sup> In this final section of this testimony, we discuss challenges for FAA in implementing the committees' certification and approval and regulatory consistency recommendations that relate to these key practices.

#### *Organizational Support*

FAA officials and industry representatives we spoke to noted that shifting priorities as well as declining resources may prohibit FAA from devoting the time and resources needed for completing the initiatives in the planned time frames. They agreed that a primary challenge for FAA will be having the dedicated resources that will be needed to successfully implement the committees' recommendations. We have previously found that successful organizational transformations and cultural changes require several years of focused attention from the agency's senior leadership.<sup>32</sup> This lesson is consistent with our previous work on organizational transformation, which indicates that support from top leadership is indispensable for fundamental change. Top leadership's clear and personal involvement in the transformation represents stability for both the organization's employees and its external partners. Top leadership must set the direction, pace, and tone for the transformation. Additionally, buy-in and acceptance among the workforce will be critical to successful implementation of the initiatives to address the two committees' recommendations.

Additionally, as we described in our 2010 report, FAA prioritizes ensuring the continued operational safety of the people and products already operating in the national airspace system over processing new certifications and approvals. We reported in the 2010 report that Flight Standards staff had little or no incentive to perform certification work under the system in which their pay grades are established and maintained.<sup>33</sup> Other than inspectors involved with overseeing air carriers, Flight Standards inspectors are typically responsible for a variety of types of certificate holders. Each certificate is allocated a point value based on the complexity of the certificate or operation, and the combined point value for each inspector's oversight responsibilities must meet or exceed the points allocated for the inspector's grade. However, not all of the inspectors' duties—including certification work—receive points in this system, and inspectors are subject to a downgrade if entities in their portfolio relocate or go out of business.

#### *Commitment to Cultural Change*

FAA and industry representatives also cited FAA's organizational culture as a primary challenge for FAA in successfully implementing these initiatives. They noted that many of the certification process and regulatory consistency initiatives FAA is attempting to implement represent cultural shifts for FAA staff in how regulations, policy, and guidance are applied, and ultimately how certification and approval decisions are made. As we have previously found, the implementation of recommendations that require a cultural shift for employees can be delayed if the workforce is reluctant in accepting such change.<sup>34</sup>

#### *Communication with Stakeholders*

Further, industry representatives have identified the lack of communication with and involvement of stakeholders as a primary challenge for FAA in implementing the committees' recommendations, particularly the regulatory consistency recommendations. Successful agencies we have studied based their strategic planning,

<sup>30</sup> GAO, *Results-Oriented Cultures: Implementation Steps to Assist Mergers and Organizational Transformations*, GAO-03-669 (Washington, D.C.: July 2, 2003).

<sup>31</sup> GAO-03-669, and GAO, *VA Health Care: Additional Efforts to Better Assess Joint Ventures Needed*, GAO-08-399 (Washington, D.C.: Mar. 28, 2008).

<sup>32</sup> GAO, *National Airspace System: Transformation Will Require Cultural Change, Balanced Funding Priorities, and Use of All Available Management Tools*, GAO-06-154 (Washington, D.C.: Oct. 14, 2005).

<sup>33</sup> GAO-11-14.

<sup>34</sup> GAO-14-142T.

to a large extent, on the interests and expectations of their stakeholders, and stakeholder involvement is important to ensure agencies' efforts and resources are targeted at the highest priorities.<sup>35</sup> However, representatives of two industry organizations we interviewed told us that FAA did not provide the opportunity for early input and that outreach is low regarding the certification process recommendations, and representatives of four industry organizations indicated that FAA has not sought their input in responding to the regulatory consistency recommendations. They reported that FAA had neither kept in contact with or advised them of its plans nor engaged the Regulatory Consistency Committee participants in the drafting of the detailed implementation plan that is expected to be published in August. As an example, as previously discussed, when Flight Standards published a memo in December 2013 calling for the cancellation of non-official guidance, several members of the Regulatory Consistency Committee were unaware of the change and expressed surprise and dissatisfaction with the action and offered their assistance. Representatives of one industry group noted that FAA sought their input on addressing the Certification Process Committee's recommendations for subsequent revisions of its implementation plan.

#### *Setting Performance Measures*

FAA has not fully developed performance metrics to ensure that any initiatives it implements are achieving their intended outcomes. We have previously found that agencies that have been successful in assessing performance use measures that demonstrate results and provide useful information for decision making.<sup>36</sup> Earlier in this testimony, we reported that FAA had not completed developing performance measures for either the certification improvement or the regulatory consistency initiatives:

- FAA had developed performance measures for 5 of the 14 certification process initiatives as of May 2014 and plans to further develop measures in three phases. In addition, most of the initiatives are scheduled to be implemented by 2017. Although we have assessed FAA's plan for developing these metrics as reasonable, the agency may miss an opportunity to gather early data for evaluating the effectiveness of its actions and making any needed corrections.
- There is no detailed plan for implementing initiatives addressing the consistency of regulatory interpretation recommendations and measuring their outcomes. In recent meetings, FAA officials told us they have had difficulty in determining how to measure the outcomes of its regulatory consistency initiatives and have not been able to determine what specific performance metrics could be used.

Going forward, it is critically important that FAA develop outcome-based performance measures to determine what is actually being achieved through the current and future initiatives, thereby making it easier to determine the overall outcomes of each of the initiatives and to hold FAA's field and headquarters offices and employees accountable for the results. We are not making any new recommendations because the recommendation we made in 2010 for FAA to develop outcome-based performance measures and a continuous evaluative process continue to have merit related to this issue. To its credit, FAA has initiated some efforts and sound planning for addressing the committees' recommendations. However, it will be critical for FAA to follow through with its initiatives and plans for developing performance metrics to achieve the intended efficiencies and consistencies. As we noted in our October 2013 statement, however, some improvements to the certification and approval processes, will likely take years to implement and, therefore, will require a sustained commitment as well as congressional oversight.<sup>37</sup>

Chairwoman Cantwell, Ranking Member Ayotte, and Members of the Subcommittee, this completes my prepared statement. I would be pleased to respond to any questions at this time.

Senator CANTWELL. Thank you, Dr. Dillingham. We look forward to asking you questions about the certification process and where we need to be to continue to make innovations and improvements.

<sup>35</sup> GAO, *Executive Guide: Effectively Implementing the Government Performance and Results Act*, GAO/GGD-96-118 (Washington, D.C.: June 1, 1996).

<sup>36</sup> GAO, *NextGen Air Transportation System: FAA's Metrics Can be Used to Report on Status of Individual Programs, but Not of Overall NextGen Implementation or Outcomes*, GAO-10-629 (Washington, D.C.: July 27, 2010).

<sup>37</sup> GAO-14-142T.



Mr. Allen, welcome. Thank you very much for being here. We look forward to your testimony.

**STATEMENT OF BERTRAND-MARC ALLEN, PRESIDENT,  
BOEING CAPITAL CORPORATION**

Mr. ALLEN. Madam Chairman, Ranking Member Ayotte, thank you very much for the opportunity to address the competitive landscape with respect to commercial aviation, the U.S. Export-Import Bank, and our industry's international competition.

My name is Marc Allen, and I am the President of the Boeing Company's product finance and aviation lease unit, Boeing Capital Corporation. I am proud to be here on behalf of Boeing, our 168,000 employees and more than 15,000 U.S. suppliers that support over 1.5 million jobs across the country.

We are unique in that 80 percent of our commercial airplane products are sold overseas, while 80 percent of our expenditures, just under \$50 billion, are made in the United States.

As a starting point, it is important to understand that aerospace is a unique industry on the global stage. Unlike other market sectors, it is considered a matter of national prestige, national competitiveness, and even national dominance for some.

In aerospace, it is not so much companies that compete as it is countries, with all their traditions, aspirations, and occasional grievances. Other countries have seen how aerospace helped the United States become the dominant economic and military power through the 20th century. Likewise, they saw how Europe, with massive state support and direction, along with three export credit agencies, created and sustained an indigenous commercial aviation industry virtually from scratch during the 1970s.

Today, Canada, China, Russia, are all making significant efforts in developing new platforms to compete on the large commercial airplane market with equally important investments being made in regional jet development in Brazil and Japan.

The Chinese aspiration, like the Europeans during the 1970s, is to develop a full family of airplanes from regional jet to narrow-body to eventually wide-body airplanes. The path is undoubtedly a long one. But every element of the Chinese government, industry, and national spirit are committed to that goal.

Boeing is very much a partner with China's aviation industry, even as we recognize that our airplanes will also have to compete against Comac, the Chinese state-owned aerospace firm.

For Boeing, the China model is simple. It is compete and collaborate, not one or the other. At Boeing, we don't shy away from competition. What we want, just as every competitor wants, is a fair chance and an even playing field.

This brings us to the role of export credit generally, and the Export-Import Bank, in particular.

First, some background on the current regime governing export credit assistance. In 2011, a multilateral agreement called the Aircraft Sector Understanding was reached, ensuring that in aviation, there is no such thing as cheap export credit. No such thing. It is a term often employed by Ex-Im critics.

But under the Aircraft Sector Understanding that the chairwoman mentioned earlier, interest rates and fees for government

export credit are set at levels that make such credit equal to or usually higher than the cost of commercial financing.

Furthermore, U.S. carriers can borrow money through domestic capital markets at even lower rates than their foreign competitors can obtain through either export credit or commercial finance.

Ex-Im's critical role as a backstop lender is powerfully shown by contrasting the last two economic downturns. My submitted testimony discusses in further detail how, because Ex-Im was able to fill the liquidity gap after 2008, Boeing jobs held strong and deliveries to foreign customers continued. In marked contrast, in the aftermath of 9/11, where Ex-Im could not engage, U.S. carriers had to abandon deliveries that led to more than 30,000 Boeing layoffs.

If U.S. export credit is in doubt, airplane customers will likely hedge their bets by turning to companies like Airbus that do have export credit guarantees. And if Ex-Im goes away, it is predictable Europe and Airbus will use export credit pricing to provide the aerospace industries there an advantage over ours, with China, Russia, and other emergent players to follow.

Boeing would then have to offer financing to many customers through my group, BCC, effectively transforming ourselves, as McDonnell Douglas did 2 decades ago, from an aerospace innovation company to a finance company. This is not a scenario that would happen immediately, but we would get there eventually. And Boeing's workers and the communities we support would pay the price.

Congress has an important decision to make in the coming weeks over the position of America and the great global aerospace competition already underway. Without the important leveling mechanism provided by the Ex-Im Bank, Boeing and its extensive U.S. supply chain would be at a significant disadvantage in the global commercial airplane markets, which we conservatively estimate to be worth \$3.6 trillion over the next 20 years.

This Nation wants to build long-term strategic relationships with trading partners around the world. We want to lead progress toward open markets. Ex-Im is a key tool for sitting at the table to do that. Without Ex-Im, the existing disciplines will collapse, and we will have no say in it.

In the end, this Congress and our country have to decide together whether it is worth playing the role of leader in this space.

Thank you very much for this opportunity to discuss these important issues. I look forward to questions.

[The prepared statement of Mr. Allen follows:]

PREPARED STATEMENT OF BERTRAND-MARC ALLEN, PRESIDENT,  
BOEING CAPITAL CORPORATION

Thank you for the opportunity to address the competitive landscape with respect to commercial aviation, the U.S. Export-Import Bank, and our industry's international competition. These interconnected issues are of great importance not only to The Boeing Company but, as my testimony will show, to America's position as the world's leader in aerospace.

My name is Marc Allen, and I am President of The Boeing Company's product finance and aviation leasing unit, Boeing Capital Corporation (BCC). At BCC, our mission is to ensure every Boeing customer has the financing they need to buy and take delivery of Boeing's great American aerospace products. We do that through outreach to the financial markets, demonstrating the value of investing in aerospace assets. We do that through arranging financing for our customers from third par-

ties, such as lessors, commercial banks, capital markets, and yes also the very important U.S. Export-Import Bank (Ex-Im). And lastly, we also execute our mission by directly providing customers with backstop financing commitments and other financing solutions, in effect serving as the lender of last resort.

Before serving at BCC, I had the privilege of serving in Beijing as president of Boeing China. And before that, I was Boeing's vice president of global law affairs and general counsel to the company's international operations. All three of these roles have deeply shaped my perspective on the topic of today's hearing. In my general counsel role, I led the Company's legal strategy for the United States' WTO case against the EU over illegal Airbus subsidies. In my Boeing China role, I got to experience firsthand the realities and importance of our Collaborate-and-Compete relationships, where engagement with respected partners equally blends with emerging marketplace competition. From each of these stops, I have developed a very personal awareness of the extent to which sovereign national interest is a reality—a high impact reality—for the modern world of global aerospace.

I am proud to be here on behalf of Boeing, our 168,000 employees and more than 15,000 U.S. suppliers that support 1.5 million jobs across the country. We are unique in that 80 percent of our commercial airplane products are sold overseas while 80 percent of our expenditures—just under \$50 billion—are made within the United States. Or, put simply, Boeing is one of the few American companies that still employs large numbers of people in this country—at middle-class wages and benefits—to build things sold in large numbers outside this country.

I know the merits and track record of Ex-Im have been widely debated in recent weeks. There is probably little you have not heard on the subject. Today, I aim to focus my statement on aspects of global export credit assistance that has not received much attention, by:

- Providing broader strategic context about aerospace—and new, well-funded emerging players such as China that should inform your deliberations and decisions about Ex-Im's future;
- Discussing the critical role of the Bank in maintaining a functioning—and fair—market for commercial airplanes; and
- Finally, assessing some of the global consequences—for Boeing and the U.S. aerospace industry—of failing to re-authorize the Ex-Im Bank.

#### **A Global, National Competition**

As a starting point it's important to understand that aerospace is a unique industry on the global stage. The rest of the world, rising economic powers especially, regard aerospace as a matter of national interest. Aerospace is not considered just another industry that produces goods or services and thus jobs and economic growth. It is considered a matter of national prestige, national competitiveness and, for some, national dominance.

Furthermore, countries like Russia, China and Brazil have seen how aerospace helped make the United States the dominant economic and military power during the 20th Century. Likewise, they saw how Europe, with massive state support and direction—along with three export credit agencies—created and sustained an indigenous commercial aviation industry virtually from scratch during the 1970s. Airbus now enjoys the status of commanding up to one-half, or more, of the global market for commercial airplanes. This position used to be held by McDonnell Douglas, before its commercial airplane business collapsed in the 1990s in large part from the pressure introduced by an emergent Airbus. It is especially important to note—for those who say government export credit isn't needed and doesn't matter—that this period of decline coincided with McDonnell Douglas' devoting more and more of its dwindling capital to finance customer purchases of its aircraft rather than investing in new products. In the decision between being a bank or an aerospace innovator, it chose bank, and lost.

The airline business is part of this, too. Just as it is common around the world to see state ownership of aerospace manufacturers, it is equally common to see state ownership of aviation businesses, like airlines. For many nations, the movement of people and goods into and out of their borders is too important not to assure directly, regardless of the country's level of economic or rule of law development.

The takeaway is that in global aerospace markets, it is not so much companies that compete; as it is countries—and all their traditions, aspirations, and occasional grievances. Whether the players on the manufacturing side are Canada and Bombardier; Russia and UAC; China and COMAC; and on—it is broadly assumed around the world that national governments will support their domestic aerospace and aviation industries.

In the realm of national competition against state-sponsored aerospace entities—both established and emergent—the United States regularly finds itself on a playing field that is constantly subject to tilt pressures, in this way and that. The role of the United States thus must be, and has been, to lead the way in pressing for an even playing field. As a nation and an industry, we have done this by suing the European Union successfully in the World Trade Organization over the illegal Airbus subsidies. And we have likewise done it by prudently deploying Ex-Im for over 80 years now; the use of export credit assistance by the U.S. being comparatively minor by our competitors' standards. Yet the carefully targeted application of export credit has been extremely effective in addressing aspects of the otherwise uneven playing field.

### **The Global Model for Aerospace Competition**

Having seen the economic and employment benefits Europe has achieved with aerospace using massive state support over the past four decades, several nations are attempting to repeat the playbook. Canada, China, and Russia are making significant efforts at developing new platforms to compete on the large commercial airplane market, with equally important investments being made in regional jet development in Brazil and Japan. These emerging players see no reason not to aim for the same glide path with their respective development efforts.

Canada and China are the two most advanced examples of this set, with Canada's Bombardier in flight testing for a new 150+ seater, the CSeries. China is not far behind Canada, with the first article of its similar sized plane, the C919, currently in final assembly. And meanwhile, its regional jet offering, the ARJ-21, is in final stages of flight testing and certification before a scheduled Entry into Service in 2015.

The development of the C-Series and C919 are important for the global aerospace community. The Chinese aspiration, like the Europeans during the 1970s, is to develop a full family of airplanes—from regional jet to narrow-body to eventually wide-body airplanes that can compete with the full range of large commercial airplanes offered by Boeing. The path is undoubtedly a long one, as the technological barriers are high but hardly insurmountable. But every element of the Chinese government, industry, and national spirit are committed to the goal.

In keeping with this type of commitment and aspiration, many of the governments of the nations listed above deploy vast resources into and coordination across their countries' supply chains, research and development, financial systems, and domestic airlines. These efforts are all directed towards the ultimate objective of growing their domestic aerospace capability, capacity, and market share. We are all familiar with the billions that Europe poured into Airbus. We may be less familiar with the support that the Canadian government has provided Bombardier. And maybe even less familiar with the support the emerging competitors in China, Russia, etc. are getting from their states, though it too will rate in the tens of billions of dollars.

The emerging nations, of course, have the advantage today, unlike Europe before, of not having to start their programs from scratch. All are working hard, and with some success, to leverage the technology lessons-learned by Boeing, Airbus, and others. And they are constantly looking for global partnerships that can yield progress for them in terms of complementary transnational partnerships. So, for example, Russia recently signed with China a Memorandum of Understanding to forge a partnership to explore joint development of wide-body airplanes.

The complexity of the world we live in could not be made any clearer than by the fact that the very nations that aspire to emerge as successful aerospace competitors are also some of our most important customers and respected partners, whether that is China, Japan, Brazil, or Russia. Just as Boeing and McDonnell Douglas before faced the challenge of selling into the key market of Europe as Airbus emerged, so too will the current manufacturers face the challenge of selling into these markets as their own product offerings emerge. Yet, successful competition within these markets will be critical, just as our ultimate successful competition in Europe has been, to Boeing's long term staying power.

These realities were made real to me during my time living and working in China. There, Boeing is very much a partner with China, including with COMAC, even as we recognize that over the long term our airplanes will also have to compete with COMAC's. We looked for issues on which we could, together, make the pie bigger for us all, like initiatives on air traffic control and biofuels. For us, the model was simple: it was about compete AND collaborate. It was not one or the other. It was both. And it is notable that recently the leaders of our governments, too, have acknowledged this as the model for our broader relations. At July's Strategic & Economic Dialogue in Beijing Secretary of State John Kerry said it well, "We are deter-

mined to choose the path of peace and prosperity and cooperation, and yes even competition but not conflict. When the United States and China work with each other, we both stand to gain a great deal and that's why we are committed to a new model of relations of great-country relationship; a mutually-beneficial relationship in which we cooperate in areas of common interest and constructively manage the differences."

At Boeing we don't shy away from competition. In fact, we welcome it. Competition makes us better and benefits our customer and those whom they serve. What we want—just as every competitor wants—is just a fair chance and an even playing field. This brings us right to the heart of the discussion about the roles of export credit generally and the Export-Import Bank in particular.

### **Role of Export-Credit**

As a company—and as a nation that cares about global competitiveness in aerospace—we are fortunate the majority of the emerging aerospace competitors have adopted an agreed approach to the use of export credit for airplane sales. Through the OECD, and via an OECD arrangement known as the Aircraft Sector Understanding (ASU), the aerospace nations have been able to agree on the most important mechanism for the control of export credit, which is price.

In 2011, in large part thanks to the good work of the U.S. Government, a multilateral agreement was reached that has ensured that in aviation there is no such thing as "cheap export credit," a term often employed by critics of Ex-Im. Every banker, lessor, or capital markets player in-the-know will tell you that thanks to the 2011 ASU, export credit for airlines, at every credit level, costs the same or more than commercial bank credit. Standard & Poor's said it clearly in a recent report on Ex-Im: "the overall cost of ECA-supported financing, particularly for stronger airlines, is now equivalent to, or even higher than, that of alternative financing sources." And the leading independent academic source who conducted blinded bank bids to assure real world conditions in measuring price has published data showing the same.

The oft-heard complaints against Ex-Im that it allows foreign airlines to buy airplanes with "cheap credit" are without merit. In prior generations, that certainly may have been the case; but as explained above, the 2011 ASU assures it is not today and will not be again—the 2011 ASU requires quarterly resets to ensure the rates stay at or above the liquid market.

Since the complaint is also sometimes made that the supposed "cheap credit" gives foreign airlines who fly to the U.S. an advantage over U.S. airlines, it bears noting that U.S. carriers can and do borrow money domestically through the U.S. capital markets at even lower rates than the commercial bank credit at which the 2011 ASU is pegged. This provides U.S. carriers millions of dollars in advantage over foreign airlines who do not have the benefit of the geopolitical security, which a U.S. airline can offer the capital markets in any bond issuance.

Bottom line, there is no such thing as "cheap export credit" for airplanes.

So why then is export credit useful and relevant? We do not have to look far back in history to answer that question. Just compare what happened in our industry following the devastating attacks of 9/11 and the more recent global economic recession that began in 2008.

Taking the more recent first, after the recession, liquidity disappeared across all financial sectors. In aviation, many of our international airline customers still had strong demand for their product—travel. But they could not persuade financial institutions to lend to them; for the same reason so many Americans during that time-frame had a hard time getting a home loan. They had good earnings, strong credit histories, and reputable backgrounds; but we faced a liquidity crisis, and our banking system was not engaging in business as usual. In the midst of that crisis, if our customers had failed to show up with money to buy the planes they had agreed to buy from us 5 or 7 years earlier, U.S. aerospace would have had its own crisis, and inevitably, layoffs. Instead, strong U.S. leadership worked as intended. In the wake of the crisis, Ex-Im stepped forward, providing loan guarantees in support of roughly one-third of our airplane deliveries at that time. On those guarantees, Ex-Im made money that went to the American taxpayer via the U.S. Treasury.

Contrast that with what happened in the wake of 9/11. Following the attacks, the U.S. airlines faced their own crises. The U.S. Government, recognizing our national sovereign interest in aviation, provided U.S. domestic carriers with billions of dollars in direct assistance. Yet the airlines, facing operational challenges and without liquid financing options to see them through, had to walk away from airplane deliveries they had previously agreed to take. Boeing in turn had to reduce production. More than 30,000 Boeing employees lost their job in the resulting layoffs. Countless more did in the supply chain.

The difference between the episodes is stark and summed up in a word: Jobs.

Returning to the first scenarios, the recent global recession, it is important to note that after the liquidity crisis was averted and the jobs were preserved, Ex-Im next acted perfectly in line with U.S. policy: walking back from aviation just as quickly as it had stepped forward during the crisis. This year, Ex-Im deliveries will be down from the one-third high water mark of the crisis, to roughly 10 to 15 percent of deliveries.

When I talk to the leaders of banks, leasing companies, and capital markets players, I hear a resounding message: ‘This is how it is supposed to work.’ They not only do not object to Ex-Im’s participation at the 10 to 15 percent range; they endorse it. They do so for the simple reason that they know Ex-Im is good policy that helps them, helps growth, and helps stabilize markets. This is hardly the response you would expect if Ex-Im were “crowding out” commercial players from financing airplanes, as Ex-Im critics often contend.

The result of the 9/11 episode also had a lesson-learned for the U.S. airlines. They are now much more likely to demand airplane manufacturers provide them backstop lending commitments when they execute contracts for airplanes. They no longer just rely on the expectation financial markets will be there for them when they get down the road 5 or 7 years to the agreed deliveries.

Boeing, via BCC, can and does provide backstop financing to some of our customers—most particularly our U.S. and European customers who are not eligible for Ex-Im guarantees. But Boeing cannot provide backstop financing to all our customers. Boeing is and chooses to be an aerospace innovator, not a bank. We have seen firsthand the risks of the other strategy in our own and other industries. Anyone who desires the U.S. to maintain its lead in global aerospace should reject it. Our focus should be on innovation, not finance.

This is where Ex-Im comes in. Our U.S. airline customers are not the only ones to feel the pinch to have backstop lending commitments in place; our foreign airline customers equally feel it. They too need certainty that if the financial markets seize up when they come to pick up their airplanes in 7 years time there will be a backstop finance option for them. Ex-Im takes that concern off the table for them. In effect, it is providing them geopolitical risk insurance that no one but a sovereign nation can offer in any meaningful and consistent fashion.

This is why Europe has not one, but three, export credit agencies in place to support Airbus. Germany, France, and Great Britain all stand by to provide backstop ECAs to Airbus buyers.

### **Role of U.S. Export Import Bank**

Ex-Im is a great and necessary equalizer. Ex-Im allows Boeing and thousands of companies in its supply chain to compete on the value of its products, rather than forcing important customers to choose between the world’s most innovative aerospace product or the world’s most secure backstop lending. When you consider that airplane purchases are regularly worth billions of dollars, which can make up a significant share of a carrier’s market value, an airline CEO must be absolutely certain he will not land his company in default on such an obligation. And a backstop lending commitment is fundamental.

Because of the great interest the airlines naturally have in securing backstop lending, if the availability of U.S. export credit is in doubt, airplane customers can be expected to hedge their bets by building preference in their order backlogs to those planes—Airbus—that do have export credit guarantees. It is for this reason the Financial Times recently said an Ex-Im shutdown “would be a serious blow to Boeing and GE and a big boost to Airbus and Siemens . . . It would also make it harder for U.S. companies to compete against China.”

The logic is simple. If the U.S. is not at the table to lead building partnerships with China and the other emerging producers, the effort to expand the current multilateral export credit regimes to them will fail; they will use export credit in predictable ways; the playing field will tilt.

Ex-Im is the tool the U.S. must use in order to sit at the table and persuade other countries to continue even-playing field habits in the use of export credit. The multilateral 2011 ASU agreement tells the whole story. By ensuring that export credit for airplanes is not “cheap credit,” it has ensured there is no subsidy in play. It has ensured there is no unfair advantage for any country, or for any segment of the aviation industry. But that simple and powerful mechanism will fail if competitors do not join the multilateral agreement; or worse, if they leave it altogether.

Case in point is a recent letter from a European turboprop manufacturer, ATR, to the OECD. It complained China was selling a competing product, the MA600, using the Export-Import Bank of China to subsidize the sale. ATR’s complaint sug-

gests the financing was being used to subsidize up to 55 percent of the cost of the plane.

It is not hard to envision the future when countries with emerging airplane manufacturers that carry the aspirations of an entire nation enter the market with export credit support like that. The best response the U.S. has remains Ex-Im. Through the statutory authorizations, Ex-Im has authorities to match subsidization when necessary to ensure fairness. More importantly, by simply holding that authority, Ex-Im creates the incentive and leverage for other nations to enter into the existing multilateral agreements that ensure everyone's even playing field.

Russia is a good example. Though Russia has not yet joined the multilateral agreement, to date, it has implicitly been willing to abide by ASU terms by entering into working together relationships with European export credit agencies. This is and must remain the model for engagement. As former Deputy Secretary of Defense John Hamre recently noted in a compelling piece on the absurdity of abandoning Ex-Im, "Our domestic dispute over the proper role of government within American society is now causing America to retreat on the world stage." We cannot both retreat from Ex-Im and also lead the emerging aerospace economies into a disciplined multilateral order that uses prudent policy mechanisms to eliminate subsidies. To lead, we need Ex-Im.

#### **A World Without Ex-Im**

It does not take a creative mind to understand the dangers to an Ex-Im retreat are not singular. They are multi-dimensional. Who can believe, for example, that after an Ex-Im shut down, the Europeans (read: Airbus) will continue to abide by the terms of the 2011 ASU?

If Ex-Im goes away, it is predictable Europe and Airbus will abandon ASU terms and use export credit pricing to provide its aerospace industry an advantage over ours. If history is a guide, it will do so on its own. But even if Europe resisted the temptation, can we believe it would continue to resist in the face of the practices ATR is already complaining about from emerging competitors? The slippery slope is obvious; and U.S. aerospace interests will suffer as a result.

Over the span of two decades, illegal European launch aid—some \$18 billion in net advantage according to the WTO—gave rise to Airbus and put McDonnell-Douglas out of the commercial airplane business. Consider the repeating scenario, as Europe races to protect or expand its market share from encroaching new competitors when it comes to export credit financing rates; and at the same time the U.S. Export-Import Bank is no longer available for American companies.

Export credit is not an unknown commodity to the world after all. Over 60 nations offer such programs. Germany, France, China, India, Italy, to name just a few use export credit at a rate that dwarfs U.S. usage. They each provide multiples of three to five times more export credit as a share of GDP than the U.S. does through Ex-Im.

In the near term, to make up for Ex-Im's absence, Boeing would have to offer financing to many customers, effectively transforming ourselves—as McDonnell Douglas did two decades ago—from an aerospace innovation company to a finance company. So many workers and so many communities across this country that depend on Boeing would pay the price. This is not a scenario that would happen immediately—but we would get there eventually.

Already, the political attacks on Ex-Im have taken a toll on our customers. Some of whom have made or are considering multi-billion dollar commitments to Boeing are telling us they are worried credit assistance will not be available down the road. We are telling them not to worry; that the U.S. always does the right thing, after exhausting every other available alternative. We give them hope because we ourselves have hope. We know a majority of members of Congress, in both the House and Senate, support Ex-Im. We know that Congress will do the right thing. But believe me, there are days this debate makes us all wonder whether we will stick to a path of sustain global competitiveness, or take an unwarranted and unwise detour towards unilateral export credit disarmament.

#### **Conclusion**

Congress has an important decision to make in the coming weeks over the position of America in the great global aerospace competition that is already underway. This is a campaign among nations, even as it is waged by companies. At Boeing, we are not asking for any special favors, much less any advantages like those long enjoyed by Airbus, or now being enjoyed by our emerging competitors. The U.S. Export-Import Bank allows Boeing—as well as other U.S. aerospace companies—the ability to market and sell our products on their merits in the face of state-subsidized competitors. Without this important leveling mechanism, Boeing and its extensive

U.S. supply chain would be at a significant disadvantage in a global commercial airplane market we conservatively estimate to be worth \$3.6 trillion over the next 20 years. Mr. Hamre said, "This is another example where America's domestic politics are causing us to retreat as a global leader." I do not believe it; but only because I am unwilling to allow myself to believe it. Mr. Hamre was right: we want the world to buy U.S. manufactured goods. We want to build long term strategic relationships with trading partners around the world. We want to lead progress towards open markets. Ex-Im is such an important tool for all of that. In the end, this Congress and our country have to decide together whether it is worth playing that role. Thank you very much for this opportunity and I look forward to your questions.

Senator CANTWELL. Thank you, Mr. Allen.  
Dr. Crane, thank you very much for being here.

**STATEMENT OF KEITH CRANE, PH.D., DIRECTOR, RAND  
ENVIRONMENT, ENERGY, AND ECONOMIC DEVELOPMENT  
PROGRAM; PROFESSOR, PARDEE RAND GRADUATE SCHOOL,  
WASHINGTON OFFICE, RAND CORPORATION**

Dr. CRANE. Thank you, Chairman Cantwell and Ranking Member Ayotte, for this opportunity to testify on the competition to U.S. aviation manufacturing from China.

I am going to try to address two different questions. The first is exactly what is likely to emerge from China in terms of a competitive threat over the next several years. The second is what can the U.S. Government do about that.

As has been mentioned here, the Chinese government has set a strategic goal of creating a competitive commercial aviation manufacturing industry. Of course, commercial aviation is not the only industry in which it has those aspirations. We have seen that in solar panels, wind, and high-speed rail, and some other industries as well.

But as part of this, they created Comac in 2008 and provided more than \$7 billion in launch aid, and have been continuing to provide subsidized credit and other financing for this manufacturer.

So what does this effort mean for U.S. commercial aviation manufacturing, including Boeing? Almost all the experts we interviewed in China and in the States believe that Comac will succeed in certifying the C919, that it is flight-worthy.

Opinions differed, however, in terms of the challenges Comac faces in terms of making it a commercial success. By the time Comac hits full production, and I think the 2018, 2019 timeframe is probably quite optimistic, it will be technologically outdated. It will be competing against already newer Boeing and Airbus models that have already come online, as well as competing against cheaper, proven used Boeing and Airbus products.

So Comac has a real problem in the sense that it is not just going head-to-head in terms of new aircraft, but also has this very large fleet of used aircraft out there that is highly serviceable.

In addition to that, it faces real problems in terms of lacking the very extensive post-purchase service and support network, financing capability, and, most importantly, reputation that Boeing and Airbus have.

So to become a global competitor, those are very large hurdles to overcome.



One area, however, in which China may become more successful, is in general aviation, where they have already purchased a manufacturer from my home state of Minnesota, Cirrus, and have recently signed a joint venture agreement with Cessna to put together the Cessna Citation model.

It is also making inroads into the component market. All the major component manufacturers for global aviation have operations in China. Those supplier facilities are in part to service the C919 but also to provide parts to other operations.

Going forward, I would be surprised if these joint ventures don't become fully integrated into their international operations, and we would see more components coming out of China that originally may have come out of other countries.

So the bottom line here is that I have doubts that China can succeed in becoming an original equipment manufacturer competitive with Boeing and Airbus, but we do see some real potential in terms of expanding its exports and production of components, and potential in general aviation as well.

What should the U.S. Government do about this situation?

First and foremost, both USTR and the Commerce Department and State Department should closely monitor the development of the C919 and potential succeeding aircraft like the C29, which is supposed to be a wide-body aircraft, and intervene promptly with WTO and other bilateral forums if there is a sense that they are using subsidies, which they have been in other supported foreign markets. I mean, this is an area where, usually, the squeaky wheel gets the grease. You may want to be a little more proactive.

Continue to press the Chinese Government in bilateral forums and at WTO to really rethink this industry-specific industrialization policy, which has been so costly and, in many ways, such a failure in so much of the world.

Ensure that Chinese aircraft components when they submit for certification at FAA do not incorporate intellectual property. Theft of intellectual property is, of course, a major problem, including in this industry.

And then work with U.S. companies and operations in China to have them voluntarily report the pressures they are facing from China in terms of making investment decisions.

I would also engage in bilateral discussions with the E.U. to discourage the use of purchases of components, which are often called offsets, a marketing tool in the sale of commercial aviation products.

Although I don't see a dramatic change in China's policy of national champions likely in the near future, persistent efforts to reduce these trade-distorting effects through countervailing duties and other measures may serve to mitigate some of the effects of these policies.

Thank you very much.

[The prepared statement of Dr. Crane follows:]

PREPARED STATEMENT OF KEITH CRANE,<sup>1</sup> DIRECTOR, RAND ENVIRONMENT, ENERGY, AND ECONOMIC DEVELOPMENT PROGRAM; PROFESSOR, PARDEE RAND GRADUATE SCHOOL, WASHINGTON OFFICE, RAND CORPORATION

“THE EFFECTIVENESS OF CHINA’S INDUSTRIAL POLICIES  
IN COMMERCIAL AVIATION MANUFACTURING”<sup>2</sup>

Thank you, Chairman Cantwell and Ranking Member Ayotte, for the opportunity to testify today on competition to U.S. aviation manufacturing from China.

Although China’s government has had a long-standing interest in manufacturing commercial aircraft, to date it has not had much success.

Until recently, China’s aircraft manufacturing industry produced aircraft almost exclusively for the Chinese military. Consequently, almost all of China’s commercial aircraft have been imported from foreign manufacturers. In 2008, the Chinese government consolidated its efforts to develop a commercial aircraft manufacturing industry by setting up a new state-owned commercial aircraft manufacturing company, the Commercial Aircraft Company of China (COMAC), to build two domestic aircraft: a regional jet, the ARJ-21, already under development, and a narrow-bodied aircraft, the C919.

What does this mean for U.S. commercial aviation manufacturing? In this testimony I will briefly discuss:

- The effectiveness of the policies and mechanisms the Chinese government has used to create “national champions” in this industry;
- The effectiveness of steps taken by foreign manufacturers to increase sales in the Chinese market while seeking to prevent transfers of key technologies to potential future Chinese competitors;
- Policy options for the U.S. and the European Union to effectively respond to Chinese industrial policies; and
- The costs of China’s current industrial policies.

More details on all of these points are in the full RAND report, “The Effectiveness of China’s Industrial Policies in Commercial Aviation Manufacturing” available on the RAND website free of charge at [http://www.rand.org/pubs/research\\_reports/RR245.html](http://www.rand.org/pubs/research_reports/RR245.html). My testimony this morning comes directly from that work.

**China’s Commercial Aviation Manufacturing Industry**

The Chinese government sees designing and manufacturing passenger jets as an important indicator of China’s technological prowess. Aviation manufacturing more broadly is seen as driving economic growth and innovation and as providing a key basis for national defense. To achieve the goal of creating a globally competitive commercial aviation manufacturing industry, the Chinese government has adopted a strategy of first engaging in domestic production and assembly using foreign designs, then developing its own designs with foreign assistance, culminating in the completely independent domestic development of commercial aircraft without foreign assistance.

To create an indigenous commercial aviation manufacturing industry, the Chinese government has employed the following policy instruments:

- (1) Setting up “national champions”;
- (2) Providing launch aid;
- (3) Compelling state-owned airlines to purchase Chinese aircraft;
- (4) Targeting orders to foreign manufacturers with assembly operations in China or who source from China;
- (5) Stipulating that foreign suppliers enter into joint ventures with Chinese partners; and
- (6) Encouraging foreign countries to purchase Chinese aircraft through diplomatic persuasion and the provision of loans.

<sup>1</sup>The opinions and conclusions expressed in this testimony are the author’s alone and should not be interpreted as representing those of RAND or any of the sponsors of its research. This product is part of the RAND Corporation testimony series. RAND testimonies record testimony presented by RAND associates to federal, state, or local legislative committees; government-appointed commissions and panels; and private review and oversight bodies. The RAND Corporation is a nonprofit research organization providing objective analysis and effective solutions that address the challenges facing the public and private sectors around the world. RAND’s publications do not necessarily reflect the opinions of its research clients and sponsors.

<sup>2</sup>This testimony is available for free download at <http://www.rand.org/pubs/testimonies/CT416.html>.

China's aviation manufacturing industry is large, although primarily focused on the production of military aircraft. The entire industry employs over 250,000 people. The smaller, commercial component of the industry has more than doubled output between 2005 and 2010. The entire industry has also become increasingly technologically sophisticated. However, in our view, Chinese government policies pursued to support the creation of "national champions" in commercial aviation manufacturing have not yet borne fruit. Although output of components for commercial aviation has grown rapidly over the last decade, the shares of China's industry in world exports and in gross industrial output in China remain very small and have not markedly risen.

For example, the ARJ-21 is constructed largely if not entirely from components manufactured by foreign companies; the C919 will also depend on modules manufactured by foreign manufacturers, although these modules will be assembled in China. China's industry continues to struggle with systems integration: projected dates for the certification of the ARJ-21 have been postponed several times; the C919 is also delayed.

So what does the future hold for China's efforts?

The experts we interviewed believe that in the coming years Chinese manufacturers will continue to improve the quality and technological sophistication of their products. Almost all believe that COMAC will succeed in certifying the C919. Opinions differed concerning likely numbers of aircraft sold and delivered. One expert noted that current sales contracts are quite "soft" and that there are several ways by which buyers can avoid consummating the final sale, not least by cancelling orders due to delays in deliveries.

Moreover, by the time COMAC hits full production, the C919 will be technologically outdated compared to Airbus's and Boeing's new models, the A320neo and 737 Max, respectively. Most of those we interviewed felt that COMAC will not truly be able to break into the international commercial aircraft market until it manufactures its next aircraft, the C929, following the C919 and quite possibly, not even then. To develop the C929, COMAC will need another round of substantial financial support from the Chinese government over a relatively long period of time. Even then, many, if not most of the experts we interviewed were skeptical that COMAC could compete successfully with Airbus and Boeing.

In short, COMAC has yet to show that it will be able to produce commercially viable aircraft, much less show that it can become a commercially competitive aircraft manufacturer. Many of the experts we interviewed while conducting this research are skeptical that COMAC will be able to compete successfully with Airbus and Boeing.

However, one area where China is likely to be more successful than in commercial aviation is general aviation, smaller aircraft used for private, charter, or corporate use. China has been buying its way into the international market. CAIGA's, China's state-owned enterprise active in general aviation has acquired Cirrus, a U.S. manufacturer. It has also recently signed a joint venture agreement with Cessna to assemble Cessna's Citation model in China.

### Foreign Investment in China

Despite the limitations of the Chinese commercial aviation industry noted above, why are foreign companies engaged in manufacturing commercial aviation products in China? There are several reasons:

- *Provide support to Chinese customers.* China's commercial aircraft fleet currently accounts for 9.6 percent of the global fleet. In light of the size of China's market, aircraft manufacturers and suppliers of major aviation components need to have operations in China to provide service to their customers.
- *Benefit from a competitive source of parts.* Foreign aircraft manufacturers and their suppliers have also turned to China for competitively priced parts. Chinese suppliers have provided intricately machined components and other technologically sophisticated components, such as parts manufactured from composite materials, at competitive prices.
- *Set up assembly operations to generate sales to Chinese airlines.* Manufacturers have found that assembly operations in China, such as Airbus's joint venture in Tianjin, facilitate sales of aircraft to Chinese airlines.
- *Purchase Chinese components as a marketing tool to encourage Chinese purchases of aircraft.*
- *Participate in the C919 program.* A slew of manufacturers have recently set up joint venture operations in China so as to be eligible to be a supplier for the C919 program.

- *Enhance the company's image in China.* Foreign companies have found that a manufacturing presence in China provides goodwill, increasing the likelihood that Chinese customers will purchase their products. Setting up manufacturing facilities for high priority projects for the Chinese government, such as commercial aviation manufacturing, is believed to generate goodwill for all of a company's activities in China.

Most major international commercial aviation manufacturers now have joint ventures in China. Foreign companies have set up these operations for a variety of reasons, but Chinese pressure for purchases of components manufactured in China and stipulations that suppliers for Chinese domestic aircraft set up joint ventures in China have definitely played a role. It would be surprising if these facilities are not eventually fully integrated into the global manufacturing base of these companies. Although some facilities, like Airbus's assembly operation in Tianjin, may remain dedicated to serving the Chinese market, over the course of the next decade we expect to see more supplier facilities in China specialize in specific products or modules and supply these to the foreign partner's global operations.

Many of the managers of foreign manufacturers with whom we held discussions argued strongly that sales of products manufactured by joint ventures in China do not compete with imports from the United States or Europe. They argued that the joint ventures serve to create, not destroy jobs in their home countries. Sales made by the joint venture would not have been made if the joint venture had not existed; imports of parts and components for assembly by Chinese joint ventures generate employment in the United States or Europe. However, in the long-run, in our view more components are likely to be manufactured in China.

Those we interviewed on this topic stated that their Chinese partners were becoming more technologically sophisticated, but only a few voiced fears of losing their technological edge to Chinese companies, as long as their own (foreign) companies continue to innovate. Their companies' extensive marketing networks, incorporation of their products on aircraft manufactured by Airbus, and Boeing, and manufacturing know-how provide them with strong incumbent advantages.

#### **Challenges for Foreign Companies**

Foreign commercial aviation manufacturers, like many companies, find investing in China challenging. All of the companies with whom we spoke while conducting research for the report had been active in China for years and had developed strategies and programs to safeguard their intellectual property and technologies. The most common approach is to manufacture key components outside of China; the joint venture then imports the component for final assembly.

Another intellectual property safeguard is that materials and components used on aircraft must be certified by aviation regulatory agencies like the Federal Aviation Administration. This global regulatory system for the aviation manufacturing industry helps to lessen the theft of intellectual property in China. Because Chinese manufacturers must obtain international certification for their components even if components are to be used in Chinese aircraft, foreign companies that believe their intellectual property rights have been injured by Chinese companies are in a position to intervene to prevent the certification and hence sale of those products.

It is worth noting that foreign (non-Chinese) aviation product manufacturers underlined the importance of innovation in preventing the emergence of Chinese competitors. This is especially important in subcomponents where the barrier posed by certification is not as high. Many companies now design products specifically for China. A number of these companies noted that by focusing on quality, improving manufacturing efficiency, and distribution, they have been able to out-compete their Chinese competitors even at the lower end of the market.

#### **Policy Options for the United States**

Both the United States and the European Union face a conundrum. China's leadership appears convinced of the efficacy of industrial policies to foster new industries and expand exports. In contrast, the United States and the European Union have attempted to move away from industrial policies because of cost, lack of efficacy, and in the interests of creating a level playing field for international trade.

In both the United States and the European Union, the "squeaky wheel" rule reigns. Trade issues are placed on bilateral agendas or brought to the WTO only if a domestic company complains. Trade negotiators focus on other industries where competition from Chinese firms threatens to have immediate consequences rather than markets like commercial aviation manufacturing which U.S. and European firms still dominate. In a world in which immediate problems are given all the attention, what can and should the U.S. Government and the EU do with regards to commercial aviation manufacturing? Several recommended options include:

- (1) Push for more transparent tenders for purchases of aircraft by Chinese state-owned airlines;
- (2) Ensure that Chinese aircraft components submitted for certification by the FAA or EASA do not incorporate intellectual property taken from other companies;
- (3) Work with domestic companies with operations in China to voluntarily report whether and how investment decisions in China have been influenced by Chinese industrial policies;
- (4) The U.S. Government should engage in bilateral negotiations with the EU to discourage the use of purchases of components as a marketing tool by Airbus and Boeing;
- (5) Continue to press the Chinese government in bilateral forums and at the WTO to dispense with industry-specific industrial policies;
- (6) Monitor the development of the C919 and succeeding aircraft and intervene promptly through the WTO and bilateral forums in response to efforts to use subsidies or other supports to enter foreign markets.

Without a dramatic change in China's policy of "national champions" none of these measures are likely to create a level playing field in China for Western manufacturers. However, persistent efforts to reduce the trade distorting effects of China's industrial policies through countervailing duties or other measures may serve to mitigate some of the effects of China's policies.

#### **Implications for the Government of China**

In our view, the Chinese government would benefit from a careful assessment of its current policies of government support for commercial aviation manufacturing and whether this activity is a good use of China's resources. China is spending well over \$7 billion for the C919; the ARJ-21 has also been expensive. Yet many experts we interviewed were skeptical that either the C919 or the ARJ-21 will ever be commercial successes. In light of the many hurdles facing COMAC, in our view this is an opportune time for the Chinese government to rethink its investments and policies targeting specific industries. Focusing its energies on creating a business environment friendly to all firms, private, foreign, and state-owned alike, will be much more likely to result in a higher payoff.

One of the lessons of the post-World War II era has been the importance of the free flow of ideas and people for technological advances. The rise of the modern multinational corporation has played a key role in these advances. These companies are adept at creating multinational teams, drawing on talent from across the globe, to develop new products and processes. They have developed systems for developing and deploying new technologies and products.

One of the goals of China's leadership has been to put the country at the forefront of global advances in science and technology. China has talented engineers and scientists and has registered significant advances in a large number of industries, including space and telecommunications. It also has a number of successful multinational companies of its own. However, to the extent foreign companies are not given the same treatment as their Chinese counterparts, as has been the case in the wind turbine and high speed rail industries, or are afraid that their intellectual property rights will not be safe, they will remain cautious about what technologies they bring to China.

If China wishes to become fully integrated into the global commercial aviation manufacturing industry, China's government would be well advised to change its current policies so as to create a more equitable business environment for both foreign and Chinese commercial aviation manufacturers. The benefits of such a policy change for China would be considerable in terms of better allocation of investment, tighter integration into global technology supply chains, and the substantial savings of putting funds currently going to support "national champions" to better uses.

Thank you Chairman Cantwell, Ranking Member Ayotte, and members of this Subcommittee for the opportunity to testify before you this morning. I look forward to answering your questions.

Senator CANTWELL. Thank you.

I thank the witnesses for their testimony.

I think to me the issue here, and I think, Mr. Allen, you, certainly, described what I call "co-opetition," the challenges of the 21st century where you have to compete and cooperate at the same time, knowing where you differentiate on those issues. And Dr.

Crane's testimony, certainly, outlined that innovation usually wins the day.

But obviously, innovation can, certainly, be hampered by the level of subsidization that happens. With the WTO, we can see that we are still 12 years down the road from the first filing of that case. Now we have a WTO decision, but there still has been no real remedy in the marketplace. So I think that that clearly paints a picture for where we are.

I had a couple questions for you, Mr. Allen, on this issue of how do we continue to work toward private sector financing in aviation. So the majority of aircraft financing isn't through the Export-Import Bank. You gave testimony to that.

But there are times, I think you put in your written testimony, that the U.S. marketplace, like after 9/11, or in the economic downturn, where you really do have to rely on those resources for financing. So if you could talk about those kinds of economic downturns.

And, two, you mentioned the Aircraft Sector Understanding. So if we didn't have an Export-Import Bank, we would no longer be party, is that correct, to the actual discussions of how to keep that financing at market-based rates? The rest of the participants being more heavily subsidized aviation manufacturers, I mean, we are the voice at the table for that actual discussion of keeping market-based rates. Is that correct?

Mr. ALLEN. Ex-Im is the critical tool that gives us, as a Nation, the leverage necessary to bring a set of multiple nations to the table for negotiations. So without Ex-Im, we might have a nameplate and a chair at the table, but we would have no influence, no effectiveness. We would have no meaningful seat at the table, because the ASU is based on the countries staring each other in the eye, recognizing that each one has the ability to harm the other through subsidization, and coming to an agreement because of that strong-backed position to say we need an even playing field.

How do we make sure that the price mechanism here is fair and even across all of industry so that there are no subsidizations involved? You only get that when you step forward with a match to somebody who is a first mover in subsidies.

Europe has historically been a first mover in subsidies. And so has much of the economic development that we have seen driven out of Asia. We see subsidies across the world.

So the USTR and Export-Import Bank are critical tools that fight against that. And if we take the bank away, we can expect ourselves to be at significant disadvantage, unable to bring others to the table.

Senator CANTWELL. And you are not even talking about the financing. You are talking about trying to shape the world debate about where this should go, a level playing field.

Mr. ALLEN. Even on the specific issue of financing, the only way we will be able to bring other nations to the table to negotiate an even playing field on financing is if we have the Export-Import Bank framework that tells them they have no advantage to lean forward and subsidize through financing their industries.

Senator CANTWELL. And what about in an economic downturn like we saw in 2008, 2009? What happened then to private financing?

Mr. ALLEN. Private financing, as we saw through the global recession, can disappear in a minute. We call them liquidity crises, where the underlying fundamentals are still there for any particular industry or even homebuyer, but the bank is not willing to lend, because of its own sense of uncertainty in the face of the crisis.

That is what happened in 2008 and 2009. And the Ex-Im Bank, one of its important roles, is to be that backstop lender who steps in in a moment of crisis and makes sure that the financial markets stay open when the underlying demand is there.

So we saw, for example, great demand for travel out of Asia throughout the global recession. It never slowed down. It never missed a beat. Those airlines, however, would have been very challenged to find financing on the open market during that time, just like most U.S. homeowners couldn't get a loan for a house during that time.

So the Ex-Im Bank stepped in and its participation in the finance for airplanes increased over that timeframe. It saved jobs. It kept the industry smooth. It stabilized things.

Senator CANTWELL. Well, certainly, any numbers that you have on what that job loss would have been without that financing I think would be helpful. While we hope it never happens again, the kind of downturn, I think it just points to some things people aren't thinking about, what a tool it is in those kinds of environments.

I will turn this over to my colleague, Senator Ayotte.

Senator AYOTTE. Thank you.

I wanted to, Dr. Dillingham, ask you about the Ex-Im Bank. I know that you are focusing on certification issues, but also the GAO has done work on the Ex-Im Bank, looking at it as well. Is that right?

Dr. DILLINGHAM. Yes, we have.

Senator AYOTTE. Because I definitely have some questions for you on the certification issue as well. But one thing, as I said in my opening statement, I have previously supported the Export-Import Bank. But I think an issue that does need to be addressed is this issue I raised about support for smaller and medium-sized companies and giving them a better chance to remain competitive in the global marketplace by obtaining credit that is not otherwise available through the commercial markets.

So as I look at the numbers for the Ex-Im Bank, more than 80 percent of the banks' financing benefits major firms. In fact, 10 companies receive 75 percent of the Ex-Im Bank financing.

So what suggestions do you have, if there are reforms made as we reauthorize the bank, in a restructure that would make this more friendly for smaller and medium-sized companies, because right now it seems pretty centered in large companies. Not that I am opposed to them being able to be competitive in the global marketplace, but I think this is an important question, especially in a state like New Hampshire, where we have the presence of larger suppliers, but a lot of smaller and medium-sized companies as well.

Dr. DILLINGHAM. Thank you, Ranking Member, for the question.

We did in fact do a report for another Committee of the Congress that we published earlier this year. As part of that report, much of the information that both you and the Chairwoman have provided to date, we had that information in our report. We did not make any policy recommendations.

We talked about the idea that small companies, as well as large companies, benefit from the existence of the Ex-Im Bank. But we didn't make any more specific policy recommendations beyond putting the facts of how it has helped across the industry.

Senator AYOTTE. So you have not made any analysis as to how we can look to ensure that medium and smaller sized businesses also have access to this opportunity for credit that is not otherwise commercially available?

Dr. DILLINGHAM. Not in the particular area of aviation that I am working in. But we have a part of GAO that has done that kind of work, and I can have them be in touch with you and your staff to provide that kind of information.

Senator AYOTTE. I think that is really important, because I think that is a question that many of my colleagues often have about the Export-Import Bank.

And I don't know if, Dr. Crane or Mr. Allen, you have any comments on those issues?

Mr. ALLEN. If I could, thank you very much for the question. It is very important.

No one in our industry works alone. No one works alone. We are a small business. Why? Because we have over 15,000 suppliers in the United States alone. The companies that you mentioned in your state are a great example for that.

So as Export-Import Bank supports the sales of airplanes, such as to markets like Kenya, which was the leading borrower with Ex-Im guarantees in this current year, what they are doing is supporting jobs at the small and medium-size businesses that make up the backbone of what it takes to build an airplane.

So we appreciate the support of the bank because of the way it lets us work together in delivering those final integrated products. But no one works alone.

Senator AYOTTE. I, certainly, appreciate that there are a lot of smaller and medium-size companies that are suppliers to Boeing, and appreciate the impact on those suppliers.

But I am also thinking of the businesses that aren't necessarily suppliers, but are on their own seeking financing, and how easy are we making it for them to be able to use this tool. This is a global marketplace, I think we all acknowledge.

I don't know if you have any comments on that, Dr. Crane.

Dr. CRANE. No.

Senator AYOTTE. Thanks.

I did want to ask about the certification process, Dr. Dillingham. This has been an issue I have heard a lot from the aviation industry about, in terms of concerns that this certification process, that we do need to very much improve how the FAA handles this process because it makes us less competitive, if industry can't get through that process in a timely fashion to ensure that they are getting the certification they need.



And so what are the top line, most important things you think we can do to really hold FAA more accountable for a greater emphasis, to ensure that we are more competitive in this certification process?

Dr. DILLINGHAM. I think the actions that Congress took in the 2012 FAA reauthorization, where it mandated that FAA work with industry to come up with solutions, and not only work with them but come up with solutions, but work with industry to actually implement those solutions.

I think that is the top-line thing that needs to be done, that FAA needs to implement those recommendations. They need to have the metrics associated with that implementation to show what progress has actually been made.

The point that I was trying to make in my oral statement, the difference between output and outcome, not just implementing the recommendations, but showing the Congress and industry what difference it has made in terms of the implementation of the recommendation.

And in the context of what we are talking about today in terms of competition, that is critically important, because, as you said, to the extent—and most of these are in fact small industries. If they are delayed in their certification or delayed in their approval, it costs money, it costs time, it does not allow for the quick and efficient export of products, because you need that FAA certification before you can start moving products offshore, as such.

So it is very critical that those recommendations be implemented, and Congress continue to monitor, as this committee is doing, that those recommendations are implemented and measured.

Senator AYOTTE. Thank you.

Senator CANTWELL. Senator Wicker?

**STATEMENT OF HON. ROGER F. WICKER,  
U.S. SENATOR FROM MISSISSIPPI**

Senator WICKER. Mr. Allen, more than 60 countries have established ECAs, export credit agencies. We are told that the elimination of the Ex-Im Bank would amount to unilateral disarmament on the part of the United States and U.S. manufacturers. I assume you agree with that?

Mr. ALLEN. Very strongly.

Senator WICKER. But let me ask you, is the Ex-Im Bank a really good idea, or is it a necessary evil that we have to have in terms of government involvement in corporate credit, that we would rather not have if the other countries didn't act as they do?

Mr. ALLEN. For 80 years, the wisdom of the Export-Import Bank policy has been ensuring that there are stabilization mechanics built into our export economy.

It has likewise been an important enabler of the development of economies that would not otherwise have access to capital markets.

So the essential question, is it a necessary evil or good policy tool, I would say it is good policy tool. It is a good policy tool. And like every good policy tool, that means its implementation is what makes it shine. And so the implementation of Ex-Im is industry-specific.

So we in aviation think about it just a bit more narrowly. We think about it in terms of the OECD and the Aircraft Sector Understanding. And our fundamental question always is, is the ASU doing its work to ensure that this good policy is being used to good ends?

That is why I hammered during my written testimony on this important fact that there is no cheap export credit in aviation, because if there were, then I could understand the barbs and the criticism from the other side. But there isn't, precisely because of this multilateral engagement.

So it is good policy. It is being implemented well. It is saving jobs. And in that respect, I don't see how the last 80 years are anything other than a terrific proof point.

Senator WICKER. If we didn't have ECAs all over the world, you are saying that modern day, 21st century governments would invent such things to promote international trade. Is that what you are saying?

Mr. ALLEN. There is a constant pressure in any government-managed industrial process to have industrial success. So other countries will constantly revert to places of subsidization.

We have to be able to always have the tools necessary to even the playing field. So just on that basis alone, and that is a defensive basis, you need the Export-Import Bank. There is also this positive basis of developing markets.

Senator WICKER. Now let me just ask you, we have GE Aviation in Mississippi. We are very pleased to have them in Batesville and Ellisville. They are a major supplier to Boeing.

How would the employees of these manufacturing plants in Batesville and Ellisville be impacted were the Ex-Im Bank Bank to be eliminated?

Mr. ALLEN. Well, the single word is "jobs." Madam Chairwoman made the great point about how important it is to quantify the jobs at stake.

Well, after the 2001 attacks, 9/11, Boeing suffered roughly 30,000 layoffs. That scale of layoffs, of course, rippled in multiples through our supply chain. A big part of that was because the U.S. airlines found themselves unable to take delivery of Boeing airplanes, unable to access the markets for financing.

No Ex-Im Bank. No support able to backstop their operation. And the result was the need to reduce the production rate and the loss of jobs. Those jobs impact the entire supply chain.

Senator WICKER. Dr. Crane, do you have a position on whether the Ex-Im Bank should be reauthorized?

Dr. CRANE. Not my area.

Senator WICKER. OK.

And, Dr. Dillingham?

Dr. DILLINGHAM. No, sir. GAO would not make that kind of statement.

Senator WICKER. OK.

Are any of the three of you aware, do these other ECAs around the globe return funds to their respective treasuries as Ex-Im Bank does?

Mr. ALLEN. Sir, I don't know that myself.

Dr. CRANE. Some do, so don't. There have been some pretty dramatic losses over the course of the years by some of these, and others have done like the Ex-Im Bank.

Senator WICKER. And we have not seen that with Ex-Im Bank. Is that correct?

Mr. ALLEN. That is correct.

Senator WICKER. Thank you very much.

Thank you, Madam Chair.

Senator CANTWELL. Thank you, Senator Wicker.

Dr. Crane, I wanted to ask you about China's efforts. They have made this a national priority. Obviously, sometimes you hear people say, you guys have an R&D tax credit. Where would you put our R&D tax credit compared to the efforts that you are seeing in China?

Dr. CRANE. There has been an interesting debate in China, with the advent of President Xi. At the party's Third Plenum, there was a statement that they want to use more market means to allocate resources.

What the R&D tax credit does, it doesn't stipulate whether you are providing R&D for aircraft or for pharmaceuticals or automobiles or food. So it is not a process of picking winners.

The recent approach in China—

Senator CANTWELL. If you were just going to measure where they are and where we are with R&D, what would you say? Are they on par?

Dr. CRANE. They are very much into this old style picking winners. So Comac is not just one instance, as I mentioned before. There is a whole host of industry. If you look at the five-year plans, they are targeted. They have had some success at times. Other times, they have not had very much success.

But I think the big difference is between having a policy like the R&D tax credit, which really doesn't pick winners, and a policy in which someone up at the top does. And I think markets have shown that the R&D tax credit is a much better way to go.

Senator CANTWELL. I would be interested in a comparison in a dollar figure, too. I have a feeling that even though we have an R&D tax credit, it is dwarfed by the amount of money that is spent in this area. But I am happy to hear data from you on that.

Dr. CRANE. On research and development spending?

Senator CANTWELL. Their whole effort in support of aviation compared to what a broad policy like R&D might do.

Dr. CRANE. A lot of money spent on aviation, though, is for bricks and mortar. And, as Boeing well knows, launch costs are incredibly expensive, and only part of that is research and development. A lot of it is the whole process of paying people to start production.

Senator CANTWELL. Mr. Dillingham, on your recommendation list, as you go through, basically saying the FAA needs to implement these policies as it relates to certification, one of the things that I think we need to deal with is the rate and level of innovation.

So, for example, Boeing built a plane that was substantially using composites, the 787. So in that case, the FAA created a center for excellence, well before the certification process, so they could

identify with both the public and private sector what the issues were related to that huge shift in manufacturing.

Where do you see that coming into play? What are the tools that could best help the FAA understand the rate and level of innovation, and stay on top of it? Because obviously, we are not going to hire tens of thousands of aviation experts, just to be on top of the latest technology at the FAA. We want them to have a process to be knowledgeable about it. What is the best way to do that?

Dr. DILLINGHAM. Thank you, Madam Chairwoman. The instance that you cite, I think it was related to the Dreamliner, Boeing's Dreamliner and it containing more composite material than ever before. And that is the way wave of the future, I think, both for big aircraft and for smaller aircraft.

The process that FAA has initiated is the organizational delegation or designee program, which allows for industries with the appropriate skills and resources and knowledge to act in concert with FAA, with FAA oversight, to be able to approve those kinds of innovations and to help spur innovation.

It is part of what the Congress mandated in the 2012 reauthorization. FAA needs to expand that process to bring in more industry partners. They need to make sure the FAA oversight of those industry partners of that kind of operation is adequate, and that those inspectors that work with industry are fully trained.

As you said, there is no way the FAA can kick all the tires. They need the help of industry. That is part of the recommendation that the Congress mandated and is part of why we say it is a critical and priority effort that they implement those recommendations.

Senator CANTWELL. Thank you.

Mr. Allen, to my colleague Senator Ayotte's focus on small business, which I always look at this, since I chair the Small Business Committee, that something like 90 percent of the transactions at Ex-Im Bank are small business. But because aerospace is such an expensive product and some of the other manufacturers, whether it is GE when you look at it just from a revenue perspective, obviously these bigger industries are a larger percentage of the actual dollars spent.

So do you oppose looking at ways to further incent small business or setting goals within the Ex-Im Bank to help small businesses?

Mr. ALLEN. Not at all. We have watched over the last several years as Ex-Im Bank has developed an increasingly strong infrastructure to reach out to small business. They have been very effective. They are now at over 90 percent of their transactions being for small business. So that commitment is very much in response to the policy directive that Congress established for the bank, and the bank has executed well on it. We support it wholeheartedly.

Senator CANTWELL. And there are many people in the supply chain who are suppliers to both Boeing and to Airbus. Is that correct?

Mr. ALLEN. Correct. In the aerospace industry, really, no one works alone. So the need to have the integrated supply chain all the way down is, A, imperative, but B, for the suppliers, they also have to supply on multiple sides to be able to continue their own strength.

Senator CANTWELL. And we are interested obviously in more innovation all down the supply chain. Is that right? I mean, that is what gives us the advantage, to have that supply chain continually innovating on their particular production?

Mr. ALLEN. Yes. We have worked very hard, especially when the 787 is discussed, to look for ways where we can engage with our supply partners in the supply chain on elements of innovation in the new airplane platform. Innovation normally is not contained just in a small bubble. It is normally in a broader ecosystem. So we do that.

Senator CANTWELL. I noticed as we were in Yakima, Washington, at a GE facility, then the GE facility. And somebody was showing us a strand of metal that basically was as thin as the hair on your head, that thin. They said, yes, we are producing this for Airbus there in Yakima, Washington, because they could produce that product more cost-effectively, more precise to what the end customer wanted.

Lots of these industries are also getting support from Ex-Im Bank. Is that correct?

Mr. ALLEN. Yes. And what you describe is a great example of how complicated the world has become, because supply chains are so integrated and economies are so integrated. But it is one of the reasons why it is all the more important that the macro level infrastructure, like the disciplines that the Aircraft Sector Understanding sets, are maintained, because they become the stability in this fast-moving world of great change.

Senator CANTWELL. You mean they are constantly on top of the dialog of preventing distortions? Is that what you are saying?

Mr. ALLEN. That is right.

Senator CANTWELL. Thank you.

Senator Ayotte?

Senator AYOTTE. Thank you.

I would ask this question of Dr. Crane and Mr. Allen.

I know that there was a discussion you just had, Dr. Crane, with the Chair about the R&D tax credit. Can you tell me what your view is in terms of what our tax rate does, in terms of competitiveness for the aviation industry, because we have the highest corporate tax rate in the world? What is our overall tax rate? Does that impede our competitiveness in a global economy when we are competing against countries that have lower tax rates?

Dr. CRANE. I think it is more, as an economist speaking, it is more the distortions. What an economist would argue would be that you want to have a very simplified, clean tax rate, because the effective tax rate for companies varies very, very widely, as you know. So to establish both a level playing field, but also ensure that there are adequate revenues for the U.S. Government, the most—

Senator AYOTTE. Simplify.

Dr. CRANE. Simplify.

Senator AYOTTE. There have been a lot of discussions about simplifying and lowering, so that it is easier to administer, in terms of the government side, but also ensures competitiveness on the other side.

Dr. CRANE. It also saves a lot of cost on the corporate side. I mean, if you had a very simple, clean tax rate, it saves in terms of accounting and legal fees as well.

Senator AYOTTE. Mr. Allen?

Mr. ALLEN. Simplified and competitive are really important principles. I am not our tax specialist, but I would also be delighted to take back the question to the company and make sure we come back to you with our thoughts and our ideas, because we do believe that we need to keep pushing toward more simplification and more competitiveness.

Senator AYOTTE. I would appreciate that, because as we think about our competitiveness, I think about where do we stand vis à vis other countries in terms of our tax code. I also think about the regulatory climate.

And, Dr. Crane, you had mentioned the issue of certification that Dr. Dillingham touched on. You mentioned it in the context of China stealing our intellectual property, which they have a clear record of doing and in many instances where companies, I am sure, like Boeing are always worried about that, with their technology, and other U.S. companies.

So what thoughts do you have in terms of the certification process that we should be looking at to make America more competitive?

Dr. CRANE. As you well know, FAA, the certification process, is extraordinarily important, because almost everybody flies. And getting in an aircraft, it is just imperative that those aircraft are safe.

And one of the things FAA has done very constructively has worked with the Chinese aviation regulatory industry, so they establish the same types of procedures and the same type of careful analysis to make sure that everything that goes into Chinese aircraft is certified.

And I think that because of the very high safety issues that you have with aircraft, it is really imperative to have a very strict regulatory regime.

Senator AYOTTE. How good is their regulatory regime?

Dr. CRANE. Thanks to U.S. Government support and the FAA, and I think this is a benefit to everyone in the world, it has become, on the aviation side, they have really adopted both European and U.S. approaches to this, as compared to food quality—

Senator AYOTTE. I was going to say, if their milk is any indication, I don't want to fly in a Chinese plane.

But yes, I think this is obviously a very important issue for the safety of our airways.

But also, what challenges do we face on the intellectual property front with the Chinese? We know that this is a big challenge for our country, in terms of our developing lots of great technology. And often, rather than invent their own technology, they are taking ours.

Dr. CRANE. Every Western company we talked to is well aware of this with China. What they have done is they have just made sure that key components are not manufactured there, precisely because of this. It is the only way to protect themselves.

Companies do take steps. They are not always successful. But we have had 35 years now of investment in China since the opening in 1978, 1979.

I think it is good to be vigilant. I am glad the U.S. Government has made it a high issue.

It really damages, long term, the Chinese economy as well. I think it is a very shortsighted approach, and I think continuing, that your statements and other statements are very helpful to kind of hammer that into the Chinese leadership.

Senator AYOTTE. Thank you. I appreciate that.

I have a question that I am going to submit to you, Mr. Allen. It is on an issue that is not directly before this committee, but I also serve on the Armed Services Committee.

I know Boeing is a prime contractor for the A-10 wing replacement program, and Congress has previously authorized and appropriated funding for replacement of A-10 wings in 2014. It is my understanding that the Air Force hasn't obligated any funds toward that yet, even though it has been appropriated by the Congress to do that.

Do you know whether or not the Air Force has obligated this or whether you are undertaking this? If you don't, if you can take this question for the record, I would appreciate it.

Mr. ALLEN. Yes, I will take that question for the record. That A-10 is a great airplane. I know that we are meeting our delivery commitments, because we are midstream on the program. But I don't know where the Air Force is on next decisions and steps.

Senator AYOTTE. I will submit a full question to you for the record, if you can get back to me, I would appreciate it.

Mr. ALLEN. Will do.

Senator AYOTTE. Thank you.

Mr. ALLEN. We will take it to our defense team.

[Response from Mr. Allen for the record follows:]

As of September 22, 2014, the A-10 WRP Program has not received an order for the 9 wings that were appropriated in FY 2014.

Senator CANTWELL. Well, I want to thank all the witnesses for your testimony today. You certainly have helped us illuminate the challenges that we face in aviation and certainly provided us with some suggestions on how we meet those challenges.

I appreciate Senator Ayotte being here and arranging the schedule so we can have this hearing.

The Subcommittee is going to continue to focus on what the United States needs to do to maintain its competitiveness in aviation. We very much get that it is a competitor-partner world.

But we also need these very important tools like the Ex-Im Bank and the aircraft sector, the organizing tools to have the debate and to make sure we are continually creating a level playing field, so we can move forward with our innovation.

Again, I thank all the witnesses for this testimony.

If other members who are not here have questions, we will have the record open for two weeks and certainly hope that you would help us in getting responses in that timeframe.

We are adjourned.

[Whereupon, at 11:41 a.m., the hearing was adjourned.]





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